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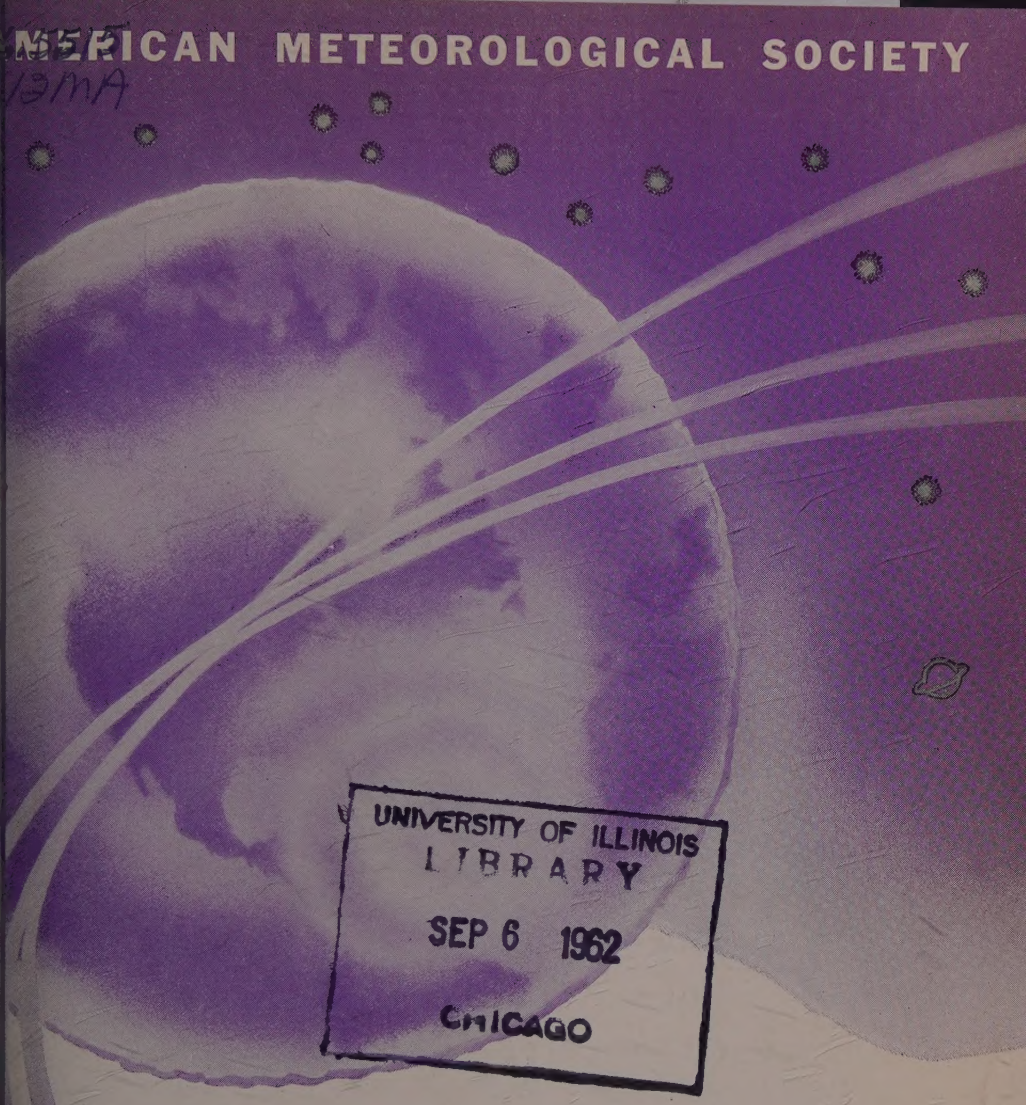

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Supplementary issue on Weather Forecasting

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METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS

MALCOLM RIGBY, Editor

Vol. 12 December 1961 No. 12, Part 1
[Pub. August 1962]

FORECASTING AND SYNOPTIC METEOROLOGY

(A Compilation of Backlog Abstracts for 1950-59)

Compiled by: Evelyn Z. Sinha

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FOREWORD

Meteorological and Geoastrophysical Abstracts is a monthly publication devoted to current literature in meteorology, geophysics and astrophysics.

Part I contains abstracts of current literature in the fields of meteorology, etc.

Part II of each issue comprises an annotated bibliography of important references on a special subject. Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution, 2. Aerobiology, 3. Cloud Physics, 4. Hail, 5. Tornadoes, 6. Volcanic Dust, 7. Climat. Changes, 8. Thunderstorms, 9. Icing, 10. Acoust. Propagation, 11. Evaporation

Vol. II, 1951

1. Extended Forecast., 2. Long Range Forecast., 3. Soil Temp., 4. Constants, etc., 5. Clim. of Near East, 6. Clim. of Middle East, 7. Special Winds, 8. Radar Storm Detect., 9. Condensation Trails, 10. Clim. of N. E. Africa, 11. Mountain Met.

Vol. III, 1952

1. Clim. of N. W. Africa, 2. Carbon Dioxide, 3. Clim. of Argentina, etc., 4. Dew, 5. Objective Forecast., 6. Stratus Forecast., 7. Urban Climatology, 8. Clim. of C. Africa, 9. Visibility, 10. Glaze and Rime, 11. Free Air Turbulence

Vol. IV, 1953

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Vol. V, 1954

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Vol. VII, 1956

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Vol. X, 1959

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Part III contains a listing of translations and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where t material may be found. The Union List of Serials (Gregory) is the source of most of t symbols used. In some cases, where no symbol has been assigned to a library, one will devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DP:	U. S. Patent Office Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by cha

Geographic locations are in the English form rather than the form used locally, for exam Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherw stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet using a modifi tion of the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Nu (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thu entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

FORECASTING AND SYNOPTIC METEOROLOGY

(A Compilation of Backlog Abstracts for 1950–59)

Compiled by: Evelyn Z. Sinha

INTRODUCTION

This compilation is the fourth of several special issues of *Meteorological and Geoastrophysical Abstracts* each containing abstracts of the literature on a specific aspect or in cognate aspects of meteorology. The abstracts were chosen from a backlog of over 12,000 unpublished abstracts which accumulated during the past five or six years. The literature abstracted was taken from publications issued during 1950–59 in a dozen languages and from a score or more of countries. The 678 items of this compilation are arranged in accordance with the scheme of the Universal Decimal Classification system (U.D.C.) for Meteorology. Cross references are provided where studies concern more than one aspect of **Forecasting and Synoptic Meteorology.**

Three special issues appeared as supplements to Vol. X (1959). These were:

1) **Instruments and Methods of Observation and Instrument Carriers** (551.501, –07, –08)
2) **Precipitation (rain, snow, hail) and hydrometeorology** (551.577–79)
3) **Agricultural meteorology** (551.5:63)

The fourth, fifth and sixth supplementary issues of backlog material were deferred to Vol. XI in order not to delay the decennial Index for Vol. I–X and the Annual Index for Vol. XI. These three bibliographies are as follows:

4) **Forecasting and synoptic meteorology** (551.509)
5) **Physical oceanography** (551.46)
6) **Dynamic meteorology, atmospheric circulation, radiation and temperature** (551.511, –13, –15)

These last three bibliographies will be published early in 1962. The material in these three compilations will be included in the Annual Index for Vol. XII, 1961.

These six special issues comprising over 5000 abstracts are being compiled and published with the aid of funds provided by the National Science Foundation for this specific purpose. Original abstracting was performed chiefly with support from the Air Force Cambridge Research Center.

The following subject outline of the contents, presented in two parts, shows in detail the arrangement of the abstracts. The first part contains the item numbers arranged within the category of Forecasting and Synoptic Meteorology—551.509. The second part contains the item numbers which refer to cognate aspects of meteorology apart from forecasting. Hence, the subject outline contains a lead to abstracts which represent the backlog of literature on Forecasting and Synoptic Meteorology and at the same time refers to subject matter of the entire field of meteorology identified within the 678 abstracts in this issue.

For a systematic outline of places included in this bibliography, *see* Index of Geographical Locations, p. 3552 to p. 3554.

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GENERAL

12L–1 551.509

Gal'tsov, A. P., **Kak predskazyvaiut pogodu.** [How to forecast the weather.] (rev. Moscow, Voennoe Izdat-vo Ministerstva Oborony Soiuza SSR, **1954.** 111 p. 31 figs. abstract on 1951 ed., *see* 4.1–22, Jan. 1953, *Met. Abs.*) **DWB** (M09.3 G181ka)—This pam on weather forecasting published by the Ministry of Defence of the U.S.S.R. is one of a of popular scientific booklets intended for the use of army and navy men. It contains all sary information on weather and meteorological elements as atmospheric pressure, wind, air perature and its change, water vapor. formation of precipitation, cloudy, rainy and bad we It discusses methods used in weather forecasting and signs of imminent changes in we *Subject Headings:* **1. Forecasting manuals 2. Popular science books 3. U.S.S.R.**—*A*

12L–2 551.509:656.7

U. S. Air Weather Service, **Terminal forecast manual for Andersen Air Force Guam, M.I.** Rev. Aug. 15, 1958 by Robert E. Zigler. San Francisco, Calif., 15th W Squadron, U. S. Air Force, **1958.** 34 p. 17 figs., 6 tables. **DWB**—This manual gives in tion about the vicinity of Guam Island in the Pacific. It is divided into three sections: lo and topography, climatic aids, and local forecast studies. Topography has an important ence on the weather of Guam. The lift given to the conditionally unstable tropical moderate or strong surface winds will cause an increase in cloudiness and precipitation. Local Forecast Study Section is subdivided into forecasting normal and forecasting othe normal weather. Forecasting normal weather is an attempt to establish a set of limits the forecaster should accept unless he has strong evidence to believe otherwise. Shear perturbations in the easterlies, the Intertropical Zone of Convergence, tropical storm typhoons are the usual causes of other-than-normal weather. Many tables and figur included. *Subject Headings:* **1. Terminal forecast manual 2. Guam Island**—*A.H.K.*

12L–3 551.509:656.

*U. S. Air Weather Service, **Terminal forecast manual, Central Air Base, Iwo Jima** pared from data for Central Air Base by Detachment 35, 30th Weather Squadron. Rev **1959.** 13 p. figs. Also: **Attachment to Manual,** rev. June **1959.** Entirely charts (18 Both loose-leaf. **DWB** (M09.5 U581te)—The present manual, prepared to orient the

assigned forecaster to the problem of tropical forecasting, brings together pertinent information with reference to Iwo Jima Air Base weather station (24°47′N ; 141°19′E). It includes information on the location and topography of the station, climatic aids, seasonal variations, and typhoons. Forecast studies including a study on forecasting air mass showers are summarized. A section on streamline analysis is also included. The manual is extensively illustrated by charts and graphical representations. *Subject Headings:* **1. Forecasting manuals 2. Terminal forecasts 3. Iwo Jima.**—*I.S.*

12L–4 551.509:656.71(02)

*U. S. Air Weather Service, **Lowry Air Force Base terminal forecast manual.** Prepared by Detachment 18, 4th Weather Group, Lowry Air Force Base, Denver, Colorado, July **1959.** 55 p. numerous figs. (some fold.) and tables. **DWB** (M09.3 U581Lo)—An extensively illustrated manual summarizing information assembled by forecasters in the Denver area over a period of years, plus more recent forecast devices, to be used as a ready reference for Lowry Air Force Base forecasters. The contents of the manual are divided into four major sections. The first section considers location and topography and other environmental factors. In the second section attention is drawn to major synoptic features and seasons. The third section considers climatic aids. An examination of operational requirements, objective forecasting aids, and of special synoptic studies, and a list of empirical rules are included in the fourth section. *Subject Headings:* **1. Forecasting manuals 2. Lowry Air Force Base, Denver, Colo.**—*I.S.*

12L–5 551.509:656.71(02)

*U. S. Greenville Air Force Base, Greenville, Miss., **Terminal forecast manual.** Dec. 10, 1958. 4 sections (unpaged). charts, figs. Photostat of typescript. **DWB** (M:629.13 U58ter)—The material compiled in this manual is divided into four sections. Sec. I discusses and shows graphically the location and topography of the region. In sec. II primary and secondary weather controls and their effect on terminal weather are considered and an example of wave development and movement in the Gulf Coast region is graphically presented. The experience level of the majority of base pilots is discussed in Sec. III, and also climatic charts—No. 1 (temperature), No. 2 (precipitation), No. 3 (annual wind rose), and Nos. 4 through 15 (monthly summary)—are explained. Sec. IV deals with operational weather requirements for student flying (Pt. 1), detachment policy number 105–40 (Pt. 2), objective studies in the "Pilot Study" phase at this time (Pt. 3), synoptic situations affecting the terminal (Pt. 4), and empirical rules established through experience of detachment forecasters (Part 5). *Subject Headings:* **1. Forecasting manuals 2. U. S. Greenville Air Force Base, Miss.**—*I.S.*

12L–6 551.509:061.3

Godske, C. L., **Information problem in synoptic meteorology: Presidential address on the occasion of the Scandinavian-American Meteorological Meeting, June 19–25, 1958, in Bergen, Norway, celebrating the 40th Anniversary of the polar-front theory.** *American Meteorological Society, Bulletin,* 40(1):1–9, Jan. **1959.** 5 figs. **DWB, DLC**—At the Scandinavian-American meteorological meeting, June 19–25, held at the Bergen school (Norway), the President of the school stressed the need for extensive information programs in meteorology, the promotion of systematic world-wide meteorological cooperation between scientists of the world. Emphasis was placed on the growing need for basic information on meteorological variables, such as pressure, temperature, density, humidity, precipitation and clouds. Some important practical economic problems in meteorology were presented. These included the climatological problem of describing average circulation and the problems of long-range weather forecasting. *Subject Headings:* **1. Synoptic meteorology. 2. Scandinavian-American Meteorological Meeting 1958.**—*N.N.*

12L–7 551.509:061.3

World Meteorological Organization Second Session of the Commission for Synoptic Meteorology. *Meteorological Magazine,* London, 87(1034):249–251, Aug. **1958.** photo. **DWB, DLC**—The second meeting of the World Meteorological Organization Commission for synoptic meteorology was held Jan. 21, 1958, five years after its initial session in Washington. The second session was at New Delhi and lasted for a month. Over 70 representatives from various countries were present at the Vigyan Bhavan Building. Reports from the committees on codes, telecommunications and others were received and discussed. *Subject Headings:* **1. WMO. Synoptic Meteorology Commission 2. WMO meetings.**—*N.N.*

12L–8 551.509(26):629.12

Frankcom, Charles Edward Noel, **Weather forecasts at sea.** *Weather,* 7(7):212–213, July 1952. **DWB**—Reply to R. G. Bolton, (*see* 3.9–68, Sept. 1952, *Met. Abs.*) describing value of weather forecasts to shipping. *Subject Heading:* **1. Marine forecasting.**—*C.E.P.B.*

METEOROLOGICAL TELECOMMUNICATIONS AND CODES USED IN WEATHER FORECASTING SERVICES (551.509.1)

12L–9 551.509.1:621.397

§**Empfangsversuche von Bildfunk-Wetterkarten.** [Tests on the reception of televize weather charts.] *Der Wetterlotse,* Hamburg, No. 126:8, Jan. 1958. fig. **DWB**—The facsimi of the televized image of the weather map from the "Seewertamt" of Sept. 7, 1957, 1200 GM received on board S/S "Transatlantic" at 51°N, 15°W, 1630 GMT, is very good. At Newfoun land and in the St. Lorenz Gulf usable images were received. *Subject Heading:* **1. Televis weather charts.**—*W.H.*

12L–10 551.509.1:551.508.57:358.1(0

U. S. Weather Service, **Utilization of artillery rawinsonde data.** Its *AWS Manual,* 105–1 Sept. 1, 1955. 13 p. 2 figs., 2 tables. **DWB**—Coding, transmission and plotting instructio for rawinsonde data obtained by U. S. Army field stations using AN/GMD-1 sets for artille meteorological calculations. The Air Weather Service does not need such data for the continent U. S. since Army stations are usually near U.S.W.B. or U.S.A.W.S. stations. Overseas con tions, however, may warrant transmission of such data for use by Air Weather Service analys The form of code is similar to that for TEMP-SHIP reports. *Subject Headings:* **1. Artille rawinsonde code manuals 2. Code manuals 3. Weather services.**—*M.R.*

12L–11 551.509.1(0

South Africa. Weather Bureau, **Kodes vir die oorseining van weerkundige oppervla waarnemings van land stasies, vanaf 1 Januarie 1949.** [Codes for the transmission of surfa meteorological observations from land stations, effective Jan. 1, 1949]. Its [*Pub.*] *W.B. No.* Dec. **1948.** Each ch. repaged. forms. In Afrikaans and English. **DWB**—*Subject Heading* **1. Transmission of reports. 2. Code manuals.**

12L–12 551.509.1:06

International Civil Aviation Organization, **Report of the Joint ICAO/WMO Meteorologi Telecommunications Meeting, Geneva, Switzerland, Feb. 24–March 8, 1958.** Submitted by Silva de Souza, Chairman. Its *Doc.* 7881–MET/Com-1, March 8, **1958.** 117 p. (each secti repaged) charts, tables. **DWB** (M09.1 J74re)—The joint meeting, under the chairmanship A. Silva de Souza (Portugal), was held for the purpose of discussing regional telecommunicati problems affecting both ICAO and WMO. Representatives of 29 countries attended. The rep gives in detail with many tables and maps, the recommended systems of exchange of vari meteorological data by teletype and radio in Europe and between other regions and Euro *Subject Headings:* **1. WMO-ICAO telecommunications meeting. 2. Telecommunication n works 3. Europe. I. Silva de Souza, A. (ed.)**—*M.R.*

12L–13 551.509.1(02)(

*Spain. Servicio Meteorológico Nacional, **Radiogramas meteorológicos (horarios y clave** [Meteorological radiograms (timetables and codes)]. Its *Publicación, Ser. C,* No. 13, **1944.** p. chiefly tables. **DWB**—A manual giving the details of broadcasts made by the Cent Office of the Spanish Meteorological Service (in Madrid) and regional offices. Synoptic coll tions, broadcasts for aviation, forecast disseminations, code groups and specifications used listed. A list of several hundred stations in the Spanish network, with lat. long. and altit is also given. *Subject Headings:* **1. Synoptic broadcasts 2. Synoptic codes 3. Meteorolo cal networks 4. Spain.**—*M.R.*

12L–14 551.509.13:06

Kuo, H. I. and Nordo, J. (both, *Mass. Inst. of Tech.*) and Woolf, R. F. (*Flight Propuls Lab. Dep., General Electric Co.*), **Dyfor (4-layer hemispherical dynamic forecasting 704 p gram).** (In: Massachusetts Institute of Technology. Dept. of Meteorology, Contract AF (604)-1000, **Final Report,** Dec. 31, **1957.** p. 367–413. tables.) **DWB**—A discussion on a description of the 4-layer hemispherical dynamic forecasting program. The authors exp the coding aspects of the Dyfor and emphasizes the fact that the Dyfor is not a product program nor is it intended to predict the weather for actual cases; but it is a device inten to test the physical model and the numerical methods used in the prediction of weather. Dyfor took about 2 man-years to write and test. Details on how it operates are inclu *Subject Headings:* **Forecasting techniques Hemispherical dynamic forecasting 3. Dy coding.**—*N.N.*

12L–15 551.509.1:061.3

World Meteorological Organization. Regional Association VI (Europe), **Resolutions and recommendations adopted by RA VI following the meeting of the Working Group on meteorological transmissions, April 1957 (and) during the extraordinary session of RA VI, Feb./March 1958.** *World Meteorological Organization, WMO* [*Publication*], No. 80. RP.33, 1958. 57 p. Mimeo. **DWB** (M(06) W927 No. 80)—Twelve resolutions (41 to 52 (57-RA, VI) were passed during the April 1957 meeting of the Working Group on Meteorological Transmissions. Two recommendations on ocean weather station communication plan and North Atlantic exchange were also made. During the extra-ordinary session of Regional Association VI of Feb. 24–March 8, 1958 six additional resolutions and three recommendations were considered. These are discussed in the paper. *Subject Headings:* **1. Meteorological broadcasts 2. Marine meteorological services 3. WMO. Regional Association VI (Europe) meeting.**—*N.N.*

12L–16 551.509.1:551.501.81

Boucher, Roland J., **An interpretive code for the weather radar.** Allied Research Associates, Inc., Boston, Contract AF 19(604)-5204, Scientific Report, No. 6, Feb. 10, **1960.** 24 p. numerous figs., 7 refs. **DWB** Also in *Weather Radar Conference, 8th, S. Francisco, April 1960, Proceedings,* issued (1960?). p. 39–46. figs., 8 refs. **DWB**—An alpha-numerical code consisting of three basic six letter-digit groups and two supplemental groups is described. The code is an operational one designed to supply the synoptic meteorologist with significant information on the immediate state of that portion of the synoptic situation within range of the radar. The code omits transitory details of echo configuration but gives general areas where echoes are found and a measure of their density. Stress is laid on the over-all echo character such as the texture on the PPI and the structure on the RHI, since these features relate to the dynamic processes. Two supplemental groups provide a means of transmitting accurate positions of squall lines and the position of the hurricane eye, as well as the speed and direction of movement of these important phenomena. *Subject Heading:* **1. Weather radar codes.**—*Author's abstract.*

12L–17 551.509.1:551.5:63

Furs, M. I., **O nastennykh kodakh.** [Wall tables of codes.] *Meteorologiia i Gidrologiia,* Moscow, No. 4:46, April **1960. DWB, DLC**—The wall table of codes for decoding agrometeorological telegrams KN-21 (issued by the Russian Hydrometeorological Press, 1958) is too large to be placed on a table under glass and cannot be hung from a wall in line with the work table. The wall code can be used only in a very limited number of stations. *Subject Headings:* **1. Weather codes 2. Meteorological codes.**—*I.L.D.*

12L–18 551.509.1(02)

U. S. Air Weather Service, **Implementation of the 3-hourly–20 minute scan observational transmission program.** Wash., D. C., Sept. 15, **1955.** 32+ p. tables. **DWB**—Instructions for observing, coding and transmitting 3-hourly, 20-minute, and other special weather observations. Communication schedules are given in detail. *Subject Heading:* **1. Telecommunication manuals.**—*M.R.*

12L–19 551.509.1:551.506.7

Petovšek, Zdravko (*Ljubljana*), **Kritična presoja in diskusija sinoptične depeše iz Kredarice.** [Review and discussion of a synoptic data report from Kredarica.] *Zagreb, Yugoslavia. Hidrometeorološki Zavod NR Harvatske, Rasprave i Prikazi,* 8(4):137–144, **1959.** 6 refs. Serbo-Croatian and English summaries. p. 137. **DWB**—Meteorological mountain station Kredarica ($\lambda = 13°51'$, $\varphi = 46°23'$, $h = 2515$ m) has many peculiarities which are due to its location, relief, exposure and quality of instruments etc. To use meteorological data reports from Kredarica in all details, and on its basis to complete a three-dimensional picture of the weather conditions, one must know the main characteristics of this station. These are explained in this article at first. Further the data report from Kredarica is discussed by code symbols separately, by calling attention to some mistakes that may happen during observation as the deviations from international code tables that are a result of peculiar circumstances. *Subject Headings:* **1. Synoptic data reports 2. International code tables 3. Kredarica, Yugoslavia.**—*Author's summary.*

12L–20 551.509.1:621.39(02)(71)

Canada. Meteorological Division, **Teldis: meteorological teletype traffic distribution.** 3d ed. effective Jan. 1, 1955. Its Cir-2563; Tel-108, Jan. 1, **1955.** 122 p. loose-leaf. **DWB**—A detailed manual in which the stations (and call letters) on each of the teletype circuits traversing Canada or portions thereof, and including some U. S. and Alaskan stations, are listed and the stations transmitted on the various types of collections also are listed. These collections

include hourly aviation reports, radiosonde, Pibal, 3- and 6-hourly synoptic, reconnaissance a pilot reports, aviation forecasts, operational forecasts, TAFOTS and ROFOTS, public foreca and map analyses. *Subject Headings:* **1. Teletype distribution manuals 2. Telecommunicati networks 3. Canada.**—*M.R.*

12L–21 551.509.1:551.501

Collis, Ronald T. H. (*Stanford Res. Inst., Calif.*), **Weather radar data transmissi** *Weather Radar Conference, 7th, Miami Beach, Florida, Nov. 17–20, 1958, Proceedings,* iss **1958.** Sec. G:19–21. table. **DWB** (M01. R124pc, 1958)—In practice, it is neither feasi nor necessary to transmit weather radar data in its absolute entirety. Accordingly, the quan of data must be reduced by selection, distillation and compression. The principles involved such reduction are stated. A list is included of available transmission systems and attention drawn to the importance of data storage in the transmission problem. *Subject Heading:* **1. Ra weather transmission**—*Author's abstract.*

12L–22 551.50

Cook Research Laboratories. Technological Center, Morton Grove, Ill., **Study to determ applicability of incremental modulations for communicating weather data.** Contract 19(604)–1385, Digital Pulse-Width Modulation, Scientific Report SR 75-1 Sept. 18, **1956.** 4 21 figs., tables, eqs.—A search for optimum means of transmitting continuous data has led the formulation of pulse-width modulation techniques for transmitting digital as well as cremental data. It is discussed in terms of an "N" factor denoting the ratio of time requi to establish reliably the ordered occurrence and the width, respectively, of pulses. Relative tra mission times for various sized numbers (or digits) with binary (fixed-width) and varia width pulses have been calculated for various values of N. Characteristic N-values for spe transmission media have been determined experimentally. They are such that pulse-width mo lation rates of transmission usually surpass those of optimized binary codes by factors from to three. Pulse-width incremental modulation of complete (continuous) radiosonde sound offers a 50 to 1 gain in transmission times over current binary (teletype) transmissions "mandatory" and "significant" levels. *Subject Heading:* **1. Weather data transmissio** *Authors' abstract.*

12L–23 551.509.1:6

Bacon, W. M.; Gross, F. J.; Robinson, E. R. and Webber, W. H., **Operational evalua of a selective weather information distribution system.** Bell Telephone Labs., Inc., Cont DA-36-039-Sc-64567, (Air Traffic Control Communications), Final Report, Task D, Pt. 1, M 1–Aug. 31, 1955. Issued Oct. 21, **1955.** 125 p. figs. (some fold.) At head of t-p: Syst engineering relating to communications facilities for the common system of air traffic con **DWB** (M:629.13 B443ai)—An evaluation was made of the data on the selective weather infor tion distribution system that employs CAA-ANDB owned magnetic drum flight plan storage eq ment and a Bell System-owned 81D1 teletypewriter switching system. The system for the tribution of weather information is discussed. *Subject Headings:* **1. Weather data transmis 2. Air traffic control communications.**—*N.N.*

12L–24 551.509.1:551

Eĭpre, T. F., **Opyt raboty ozernoĭ gidrometeorologicheskoĭ stantsii Tiĭrikoia.** [Wor the Tiyrikoya Hydrometeorological Lake Station.] *Meteorologiia i Gidrologiia,* Leningrad; 12:40–43, **1957.** 3 figs. (incl. 2 photos). **DWB, DLC**—The author describes the methods the results of hydrometeorological observations on Lake Chuda at the Tiyrikoya Hydrom orological Station situated on the western shore of the lake in the village of Tiyrikoya at Catskills of the city of Mustre. The Chuda Pskov Lake is involved in the construction of Chuda-Baltic water route, various reclamation projects and the operation of the Narvo Hy electric Station. Summaries and discussions are presented of the results of observation oscillation of water surface level, seiches, temperature of the hydrological and ice regime in parts of the lake, hydrological sections such as Mustre-Gdor, observations on evaporation ca out by means of instruments set up on a raft, etc. Photographs showing a shelter with an matic recorder of water level and instruments set up on a raft and a map illustrating the h logical sections are presented. *Subject Headings:* **1. Hydrometeorological services 2. Hy logic observations 3. Tiyrikoya Hydrometeorological Station 4. Estonian S.S.R.**—*I*

12L–25 551.509.1:551.5

Forsythe, P. A.; Vogan, E. L.; Hansen, D. R. and Hines, C. O., **The principles of JAN a meteor-burst communication system.** *Institute of Radio Engineers, Proceedings,* 45 1462–1657, Dec. **1957.** 20 figs., 42 refs., 7 eqs. **DLC**—The JANET system of long-range

munication employs vhf radio signals which are forward-scattered by the ionized trails of individual meteors. The propagation characteristics and design considerations of such a system are surveyed in this paper, and preliminary operating experience is summarized. *Subject Headings:* **1. JANET system 2. Meteor trail radio transmission.**—*Authors' abstract.*

12L–26 551.509.1

Hagen, Norman R., **New agreements for connections to weather teletype circuits.** *American Meteorological Society, Bulletin,* 35(10):500–501, Dec. 1954. ref. **DWB**—This simplified form of agreement provides for private connections to government teletypewriter circuits carrying weather information. Copies of the agreement and letters of transmission are reproduced. A review of the history of the form of agreement since before World War I is presented. *Subject Heading:* **1. Weather teletype circuits.**—*I.L.D.*

12L–27 551.509.1

Hansen, D. R., **Operating principles and design considerations of Janet systems.** *AGARDograph,* Paris, No. 26:57–61, July 1957. 2 figs. **DWB** (629.1322 N8264a)—The basic operational principles of the Janet system are described. A number of design considerations of Janet systems are discussed. These include the gating of the systems, the information storage elements, the modulation method and the antennae design. *Subject Heading:* **1. JANET system.** —*Author's abstract.*

12L–28 551.509.1

Hansen, D. R., **Some operational characteristics of the Canadian Janet system.** *AGARDograph,* Paris, No. 26:63–69, July 1957. 3 figs., table. **DWB** (629.1322 N864a)—The present Canadian Janet system is described, and parameters for a link designed to provide two-way teletype communicate across a link of limiting range of 2000 km are given. Operational results from communication tests are presented. These results include diurnal effects, seasonal effects, error rates and the effect of auroral disturbances. *Subject Heading:* **1. JANET system.**—*Author's abstract.*

12L–29 551.509.1:621.396.7

Kawahara, Takeo; Nakanishi, Koji; Akiyama, Hiroshi et al., **Report of Telecommunication Subcommittee for the Japanese Antarctic Research Expedition, Pt. 2.** *Antarctic Record,* Tokyo, No. 5:51–66, Sept. 1958. 12 figs. (incl. photos), 5 tables. In Japanese; English summary p. 51–53. **DWB**—One of the two rhombic antennae directional to Tokyo and Mawson, the V-type, is described. There has been a direct radio telegraph communication between the Syowa Base and Japan since Feb. 11, 1957 and the Tokyo office of the International Telegraph and Telephone Co., Ltd., has been receiving regular photographic reception since then. Details are reported in this paper. *Subject Headings:* **1. Telecommunication 2. Japanese Antarctic Research Expedition.**—*N.N.*

12L–30 551.509.1

Times Facsimile Corporation. *American Meteorological Society, Bulletin,* 33(7):359–360, Sept. 1955. 2 photos. **DWB, DLC**—A description of the organization of the Times Facsimile Corporation. *Subject Heading:* **1. Times Facsimile Corp.**—*L.L.D.*

12L–31 551.509.1:551.594.12:551.590.25

Bliss, W. H. (*RCA Lab., Princeton, N. J.*); Wagner, R. J. and Wickizer, G. S. (*both RCA Lab., Riverhead, L. I., N. Y.*), **Experimental facsimile communication utilizing intermittent meteor ionization.** *Institute of Radio Engineers, Proceedings,* 45(12):1734–1735, Dec. 1957. fig. **DLC**—Preliminary tests of facsimile transmission over a 910-mi path have been made at 40 mc by means of intermittent meteor ionization. Printed material was scanned at a rate of 2 frames per second with a resolution of 67 elements per inch. Frequency modulation with a deviation of ± 4.5 kc was employed at the transmitter, while a 27-kc bandwidth was used at the receiver. An all-electronic facsimile system recorded a picture when the received signal rose above a preset threshold. Although insufficient data are available to draw any conclusions, the initial results are encouraging. *Subject Headings:* **1. Facsimile map transmission 2. Intermittent meteor ionization.**—*Authors' abstract.*

12L–32 551.509.1:621.394

Lally, Vincent E.; McInnis, Donald H. and Myers, Robert F. (*Atmospheric Devices Lab., A. F. Camb. Res. Center*), **The transmission of analyzed weather charts.** *American Meteorological Society, Bulletin,* 38(2):62–66, Feb. 1957. table, 3 refs. **DWB, DLC**—Various de-

ficiencies of facsimile transmission of analyzed weather charts are indicated. Higher speed an better definition can be obtained with facsimile techniques by using wideband transmission line but at an exorbitant cost. A more economical solution is the development of more efficient codin techniques for transmitting the weather charts. A code is outlined which is 50 times more efficien than facsimile, and equipment is described which uses this code to transmit charts faster, on larger scale, and in color. *Subject Headings:* **1. Facsimile map transmission 2. Weather cha transmission by code.**—*Authors' abstract.*

12L–33 551.509.1:551.509

Practical value of radio weather bulletins. *Marine Observer,* London, 29(183):35, Ja 1959. **DWB, DLC**—The practical value of radio weather bulletins can be recognized from th number of letters the ships officers receive to indicate the usefulness of these bulletins in navig tion. *Subject Headings:* **1. Radio weather broadcasts 2. Marine weather broadcasts.**—*N.M*

12L–34 551.509.1:621.396.9:614.8:551.509

National Association of Radio and Television Broadcasters, Wash., D. C., **When disaste threatened, they counted on radio.** pub. 1965. 15 p. **DWB**—In this pamphlet examples a given of the remarkable functioning of commercial radio stations in the United States and th valuable service rendered by them to the public in emergencies such as the tornadoes, hurrican and floods of 1955. *Subject Headings:* **1. Accident prevention 2. Radio warnings 3. Met orological services.**—*G.T.*

12L–35 551.509.1:621.394.

Novotný, Miloslav, **Spojovací prostředky a mezinárodní výměna meteorologických i formací.** [Means of communication and the international exchange of meteorological inform tion.] *Meteorologické Zprávy,* Prague, 10(5): 130–131, 1957. Czech and Russian summari p. 130. **DWB**—Problems of meteorological data exchange (especially by means of radio tel type and facsimile) as discussed during several recent international conferences (Utrecht 195 Dubrovnik 1956, etc.) are briefly reviewed. *Subject Headings:* **1. International meteorologic data exchange 2. Facsimile map transmission.**—*G.T.*

12L–36 551.509

Špiner, P., **Primena magnetofona u službi veze.** [Use of tape recorders in communicati service.] *Yugoslavia. Hidrometeorološka Služba, Vesnik,* 5(1/2):35–36, Jan./June 195 **DWB**—Suggestions for saving time and labor by using tape recorders in receiving meteorologic data through radio signals, and especially by using different speeds for recording and for pla back. *Subject Headings:* **1. Weather data transmission 2. Tape recorders.**—*GT*

12L–37 551.509.1:621.3

Truitt, L. E. (*U. S. W. B., New York, N. Y.*), **Radio facsimile on board Thomas Nelso** *Mariners Weather Log,* Wash., D. C., 2(4):106–109, July **1958.** 5 figs. **DWB, DLC**—Ra facsimile equipment is a boon to the shipping industry. Its greatest advantage is perhaps th courses can be predetermined from four daily surface maps and available forecast maps. A br report on the successful test of the radio facsimile aboard M/S "Thomas Nelson" during J Jan. 1958 trans-Atlantic crossing is given here. *Subject Heading:* **1. Radio weather broadcas** —*W.N.*

12L–38 551.509.1:621.39

Tele-Dynamics, Inc., Phila., Pa., **Report of TELEVELOFAX design study (design stu report).** Contract AF 19(604)–4977, TDI Publication 900, August 1959. 133 p. 13 figs., charts, 4 tables, 15 refs., special insert (fold) in back.—TELEVELOFAX, literally the sw reproduction of an exact copy at a distance, is a system for the efficient transmission of analy weather charts. The receiver accepts digital data from a radio or land-line communication l and causes this information to control the firing pins of an electrographic matrix printer. analysis is made of the information content of weather charts based on a statistical sampling over 3,000 charts. The analysis permits a direct measure of the efficiency of any coding sche for weather chart transmission. Several system designs are evaluated, and rejected on the ba of low efficiency or high complexity. The final design, which permits the transmission of alp numeric and symbolic data, provides reproduction of isoline data in dotted form. A detai description of the final Televelofax design is given and cost figures estimated. The efficiency the system for weather chart transmission is computed. The system, operating over a 2000- per second communication link, will print the average 12 × 18 inch weather chart in 41 seco *Subject Heading:* **1. Weather chart transmission.**—*Author's abstract.*

12L–39 551.509.1:621.396(26)

Argentina. Servicio Meteorológico Nacional, **Transmisiones meteorologicas especialmente-para la navegacion: vigencia desde el 15 de Enero de 1954.** [Meteorological transmission especially for navigation, in force from Jan. 15, 1954.] Its *Serie E,* No. 17, 1953. 47 p. maps. **DWB**—Contains list of Argentine meteorological stations, their numbers and a chart of Argentina showing location of all stations broadcast by the coastal stations which serve marine interest. Contents and details of transmission (by radio) for various zones are listed. *Subject Headings:* **1. Marine meteorological broadcasts. 2. Argentina.**—*M.R.*

12L–40 551.509.1

Spröte, Helmut, **Das Lesen der Funk-Wetterberichte.** [Reading of radio weather reports.] *Der Wetterlotse,* Hamburg, No. 126:1–7, Jan. **1958. DWB**—As an aid to ship officers, 39 English abbreviations and 109 meteorological terms commonly used in transmission of the international weather reports from the radio stations NNS, CHF, VPS, GYZ, GYC, GZH, etc. are given in the equivalent German terms. Additions will be published in this magazine. *Subject Headings:* **1. Marine weather broadcasts 2. International weather report transmission 3. International weather reports.**—*W.N.*

12L–41 551.509.1:621.398(023)

Borden, Perry A. (*Univ. of Dayton, Ohio*) and Mayo-Wells, Wilfrid J. (*Consultant U. S. Natl. Bur. of Standards*), **Telemetering systems.** N. Y., Reinhold Pub. Corp., **1959.** 349 p. numerous figs. and photos, refs. **DWB** (621.374 B728te)—A textbook that contains information on the basic concepts of the operation of telemetering systems. The volume treats the current, voltage, frequency, position, and impulse systems of telemetering. Telemetering pickups, links, channels, coordination, methods of applying the systems, their reliability and, lastly, the future of telemetering systems are covered. The appendix lists the new terms in use and their meanings. *Subject Headings:* **1. Telemetering systems 2. Telemetering textbooks.**—*N.N.*

12L–42 551.509.1:551.556.8:551.466.3

Shinners, Willard (*Marine Observations, U. S. Weather Bureau*), **Hints to the observer (on wave reporting).** *Mariners Weather Log,* Wash., D. C., 4(6):199, Nov. **1960.** fig., table. **DWB**—A study of the present wave code was carried out for the meeting of the World Meteorological Organization Commission on Maritime Meteorology. It was noted that the coding procedure is incomplete and creates a bias. Therefore, the United States proposed two changes: one was a change in coding procedure so as to permit reporting wave heights by means of two figures at 1½ feet (½ meter) intervals; the other was that wave direction would be reported to 8 points by a single figure instead of 2 figures as at present. *Subject Headings:* **1. Wave coding procedures 2. World Meteorological Organization.**—*K.C.*

REGULAR METEOROLOGICAL BULLETINS, CHARTS AND DIAGRAMS USED IN FORECASTING (551.509.2)

12L–43 551.509.2(09)

Griggs, Armond L. (*U. S. W. B.*), **Background and development of weather charts.** *Special Libraries Association. Geography and Map Division,* Bulletin, No. 21:10–13, Oct. **1955. DWB**—The history of the use of weather maps in meteorological research and forecasting is traced over the past 100 years, and the work of the IMO Commission on Projections for Meteorological Charts (established at Salzburg in 1937) reviewed. In the years from 1937–1947, when the commission met again in Toronto, 53 of the 57 National weather services had adopted their recommendations regarding use of standard projections and scales. In 1937 the U. S. W. B. was using < 10 types of synoptic charts and in 1947 > 60. The WBAN established in Wash., D. C. in 1947 and NWAC now serving as the greatest analysis center in the world (at Suitland, Md.) now using 78 types of charts, are discussed. *Subject Headings:* **1. Weather charts 2. History of weather charts 3. IMO. Projections for Meteorological Charts Commission.**—*M.R.*

12L–44 551.509.2

†U. S. Air Weather Service, **The local-area surface charts, its preparation and use.** Its *AWS Manual* 105–35, Jan. 29, **1960.** 78 p. 33 figs., 33 refs. **DWB** (M(055)U58am)—This manual has reviewed some basic procedures and techniques for plotting, analysis, and prognosis of the LASC. Emphasis is placed on the use of the LASC as both a work chart and a briefing aid to support local-forecasting requirements in AWS detachments. An example of the analysis and use of the LASC was included to illustrate the material discussed in this manual. The

choice of an illustration from the Central United States was dictated by the availability of complete set of appropriate data from this area and was not meant to imply that the procedure can only be applied in the North American area. The Detco at each overseas base should tailo these techniques and procedures to the particular synoptic and operational situation in his loca area. For instance, in Europe, a nephchart modification of the LASC (paragraph 3.4.1.2 might be more useful than the Activity Chart as described in paragraph 3.4.1.1 or a complet LASC. In summary, this manual was written to suggest, and above all, to promote ideas fo fuller utilization of the LASC in all AWS detachments. *Subject Headings:* **Local-area surfac chart manuals 2. Central United States.**—*Author's abstract.*

12L–45 551.509.2:551.515.23:551.526.6:551.515.21/

Gherzi, E., **Meteorological notes.** New Orleans, La., Loyola Univ., **1959.** 35 p. 12 chart 5 refs. Pt. A, **Drawing of surface weather maps for forecasting the formation and th motion of tropical cyclones.** Pt. B, **The sea-surface temperature and the formation tropical cyclones. DWB**—Methods of forecasting hurricane directions in maritime areas a discussed. These techniques rely on surface temperature, pressure and humidity reports. Th author describes the method of indicating the formation, location and motion of tropical cyclon and a method used for a similar study in the Far East. Pt. B of the report discusses the form tion and intensification of tropical cyclones in general. *Subject Headings:* **1. Tropical cyclon track forecasts 2. Surface weather charts. 3. Tropical cyclone formation. 4. Sea-surfac temperature effects 5. Hurricane forecasting.**—*N.N.*

12L–46 551.509.2(26)(0

Markgraf, H., **Geschichtliche Entwicklung der Ozeanwetterkarte.** [Historical develo ment of ocean weather charts.] *Wetterlotse,* Hamburg, No. 145/146:118–128, May **1959.** 6 fig **DWB**—The history of the development of synoptic weather maps from the time H. W. Brand constructed (during 1816–1820) the first historical map for every day of the year (1783) to t beginning of regular publication of daily weather maps in France in 1863, is sketched briefl This is followed by an account of the history of ocean weather maps, which were issued first France in 1864 in the "Atlas des mouvements généraux de l'atmosphére de l'Observatoire Paris." Subsequent weather maps by Woffmeyer, director of the Danish Meteorological Ins tute and by the Deutsche Seewarte in 1923, etc. are discussed. Examples of the various oce weather maps are presented. *Subject Headingss* **1. Marine weather charts 2. Synoptic char** —*I.L.D.*

12L–47 551.509

§Spruance, John S., **How to read a weather map.** Wilmington, Delaware, News-Journ Co., Nov. **1953.** 12 p. diagrs. **DWB**—A series of 8 articles explaining the use of weath maps to the general public. Several U. S. Weather Bureau Daily Weather Maps as prepar at Wilmington, Del., are presented and analyzed, with particular attention to applications local weather forecasting. Climatic characteristics of Delaware are also discussed. A br glossary of elementary meteorological terms is included. *Subject Headings:* **1. Weather ma 2. Wilmington, Dela.**—*G.T.*

12L–48 551.509.2:551.501.1:656.7:551.509

American Technical Society, Chicago, **The weather map.** Chicago, **1944.** 54 p. char diagrs. (Flight No. 31) **DWB**—A thorough exposition of the more simple aspects of me orology which affect the preparation, analysis and interpretation of weather maps, especially aviation interests. The principal instruments are described and illustrated, then the meth of observation are treated, followed by details of the synoptic codes and their plotting on weath maps. The standard methods of analysis according to the frontal theory are developed in usual manner, and finally characteristics of various air masses are discussed. One unanaly and two analyzed charts of the U. S. A. are included. The codes and symbols explained her are now partially obsolete, though still good in general. *Subject Headings:* **1. Synoptic analy 2. Aviation weather maps 3. Synoptic codes 4. Observation techniques 5. Aeronauti meteorology.**—*M.R.*

12L–49 551.509.2:551.515.

*Canada. Meteorological Div., **The structure and representation of occlusions and up fronts.** Its *CIR*-2004; TEC-98, Sept. 11, **1951.** 10 p. chart (in color), 12 refs. **DWB**—No for students in training courses on occluded fronts, trowals, upper cold and upper warm fro and their representation on synoptic charts. *Subject Headings:* **1. Synoptic charts 2. Upper front structure 3. Occluded fronts.**—*M.R.*

12L–50 551.509.2:551.542:551.557

§Giorgia, P. (*Geophysics Research Directorate*), **Preparation of synoptic charts and the computation of geostrophic winds.** (In: Lettau, H. H. and Davidson, Ben (eds.), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:7–12. table) **DWB**—For the theoretical analysis of wind profile data in the lower 2000 meters of the atmosphere it was necessary to investigate the horizontal pressure gradients in a height range which includes the pressure surfaces from 950 to 750 mb. The absolute topography at 950 mb surface was determined from surface observations and the relative topographies based on the height differences reported by a radiosonde station in the region were constructed at 50 mb. intervals up to the 750 mb. surface. A detailed description of the analysis for O'Neill, Nebraska is presented, the charts and data being given in Vol. II. The methods used to compute the geostrophic wind namely the "direct" and the "diamond" methods are described and evaluated. A table summarizing 850 mb. Geostrophic Winds (m/sec) for O'Neill, Nebraska from Large Scale Map Analysis analyzed at New York Univ. is presented in order to compare the reliability of geotrophic wind analysis made at O'Neill. There was an insignificant difference in mean wind speed but a significant difference in direction. *Subject Headings:* **1. Geostrophic wind computation 2. Synoptic chart preparation 3. O'Neill, Nebr.**—*I.L.D.*

12L–51 525.1:551.509.2

Cooper, W. E. H. and Penner, C. M., **The "degree of latitude" as a unit of distance and its application to chart measurements and calculations.** *Canad. Meteorological Div., CIR-426, TRA-17,* Feb. 3, **1954.** 5 p. 4 figs. **DWB**—The exact values of units of latitude, knots, etc. are given, and handy methods of calculation or estimation of distances on synoptic charts described and illustrated. Especial application to geostrophic wind computations and to movement of pressure centers, fronts, etc. in absence of geostrophic scales is stressed. *Subject Headings:* **1. Synoptic charts 2. Geostrophic wind computation.**—*M.R.*

12L–52 551.509.2

Edwards, Frank, **Irish Sea forecasts.** *Weather,* London, 9(8):253, Aug. **1954. DWB**—Plea for special forecasts for the Irish Sea steamer crossings, or frequent broadcasting of weather reports. *Subject Headings:* **1. Marine forecast bulletins 2. Irish Sea.**—*C.E.P.B.*

12L–53 551.509.2:551.509.312:681.14:621.38

Haug, O., **A method for numerical weather map analysis.** *Norway. Meteorologiske Institutt, Scientific Report* No. 5, 1959. 10 p. fig., numerous eqs. **DWB** (M09.312 N863sc)—A brief analysis of weather maps designed for use along with electronic computers. The report illustrates how the machine can compute the height differences over sufficiently large distances. From a series of computations it is possible to obtain a result that eliminates some errors in a dense network of observations, even at 200 mb level. Results reported here correlate with the observed wind values when the curvature of the trajectories is taken into account. It is concluded that "sea level analyses with a gridsize of 300 km are able to describe the significant details in the sea level pressure field." *Subject Headings:* **1. Numerical analysis 2. Electronic computations 3. Weather map analysis.**—*N.N.*

12L–54 551.509.2:551.542

Vederman, Joseph and Ross, Robert B. (*both Natl. Wea. Analysis Center, U. S. W. B., Wash., D. C.*), **Northern Hemisphere normal 1000-MB charts.** *American Meteorological Society, Bulletin,* 39(1):28–31, Jan. **1958.** 12 figs., 6 refs. **DWB, DLC**—Monthly normal sea level charts are not always satisfactory, so normal 1000 mb height charts have been prepared for the Northern Hemisphere for each month and are reproduced, with explanations of the methods used by the National Weather Analysis Center in preparing these charts. They are useful in computing 1000–500 mb thickness charts and departures from normal thickness. The charts were prepared by subtracting normal 1000–700 mb thickness from normal 700 mb height, with adjustments where discrepancies occurred (when compared with normal sea level charts), especially in tropical areas when upper air data were scarce. *Subject Headings:* **1. Northern Hemisphere normal 1000 mb charts 2. Northern Hemisphere.**—*M.R.*

12L–55 551.509.2

Aldo, Cicala, **Un metodo simbolico di descrizione del tempo ad uso del publico.** [Symbolic method of describing weather for the use of the public.] *Rivista di Meteorologia Aeronautica,* 13(1):29–30, Jan./March **1953.** 2 figs. In Italian. **DWB**—A series of pictorial symbols are suggested and illustrated for use in weather charts to be used by the public. It is presumed that the public cannot comprehend the standard weather symbols, whereas these more

graphic symbols are obvious when referring to hydrometeors (i.e., rain, snow, lightning, etc.) weather (sun, cloud, storm or gale). *Subject Headings:* **1. Meteorological symbols 2. Weath maps.**—*M.R.*

SYNOPTIC BULLETINS, CHARTS AND DIAGRAMS FOR SHORT RANGE FORECASTS (551.509.21)

12L–56 551.509.

Engel, Louise S. (*U. S. Weather Bureau*), **Reading the newspaper weather map.** *Child of the American Revolution,* Wash., D. C., 43(1):7–9, Jan. **1954.** diagr., photos. **DWB—** short illustrated article showing how to read and interpret the newspaper weather map issued the U. S. Weather Bureau in terms of future development. Two excellent photos of cumu nimbus clouds are included. *Subject Headings:* **1. Weather maps 2. Amateur forecasting** *M.R.*

12L–57 551.509.21

Germany. Deutscher Wetterdienst, **Wetterkarte.** [Weather map.] First issue seen, 243, Sept. 1, 1948 (issued by the preceeding Deutscher Wetterdienst in der US-Zone). Publi tion is current. Daily. Each issue about 4 p. Charts, tables. **DWB** (M.09.2/43 G37we **DLC**—*Subject headings:* **1. Meteorology 2. Weather maps 3. Europe.**

12L–58 551.509

Portugal. Serviço Meteorológico Nacional, **Normas de marcação et traçado de car perfis e diagramas meteorológicos.** [Standards for plotting and drawing charts, profiles meteorological diagrams.] Its *RT* 291, Cir. 94, May 22, **1956.** 30 p. forms. **DWB—**Instr tions are given in detail for entering data and drawing isolines, fronts, etc. on all manner surface and upper air charts. Cross sections, thermodynamic diagrams, prognostic charts, for aviation, marine and domestic use, in accordance with the latest WMO-ICAO instructi Special types of charts such as sferics, tropopause, ice and turbulence charts, and maps show temperature, precipitation, state of ground and cloudiness, stream line and isotach charts treated. *Subject Headings:* **1. Meteorological charts and diagrams 2. Synoptic chart prep tion.**—*M.R.*

12L–59 551.509.21

Rodewald, Martin, **Eine Bordwetterkarte—falsch und richtig.** [A ship's weather cha false and true.] *Wetterlotse,* No. 52:40–43, Feb. **1953.** 2 figs. **DLC**—Chart for 4.2.53, 1 as wrongly drawn on board ship from Dunstable broadcast, and the correct chart. Part of error was due to two reports being wrongly placed. *Subject Heading:* **1. Synoptic chart** *C.E.P.B.*

12L–60 551.509.21(

*Turkey. Devlet Meteoroloji Isleri Umum Müdürlügu, **Günlük Meteoroloji Bülteni [I** Meteorological Bulletin], Oct. **1957.** 31 loose sheets. Entirely tables. **DWB**—Each daily b tin contains pressure, wind, temp., relative humidity, precip. and weather data for abou stations in Turkey. *Subject Headings:* **1. Daily weather bulletins 2. Turkey.**—*M.R.*

12L–61 551.5

§U. S. Office of Naval Operations, **Catalog of weather charts.** Its *NAVAER* 50-1Gi May **1956.** 19 p. Mostly charts. **DLC** (Z6683.C45U53)—A catalogue of weather charts lished by the U. S. Navy, on a variety of projections and scales: Meteorological plotting c —U. S. and North Atlantic, Europe, Asia, Western Pacific U. S. and North Pacific, North Pa U. S. and Caribbean, Eastern U. S., Central U. S., Western U. S. and Mediterranean—a Lambert conformal conic true at 30° and 60° projections; Central American waters on Mer Projection; South Pole on Polar Stereoscopic Projection; Antarctic continent on azimuthal distant projection; a weather plotting chart; North Pole on polar stereographic projection. and sizes available are noted. Procurement supply points and areas served are listed. Re tions for these charts should be submitted on form NAVAER 140. *Subject Heading* **Weather charts 2. Weather plotting charts.**—*E.Z.S.*

12L–62 551.509.

U. S. Weather Bureau, **International station numbers for North and Central Am** 3d ed. Wash. **1954.** 54 p. diagrs. **DWB, DLC**—A list of all synoptic stations in North Am with latitude, longitude and elevation contains general instruction, assignment, patterns, a tions (WMO) by countries for World Block 70 (Alaska) with map and numerical list,

72 and 74 (Canada and U. S.), U. S. Slant numbers, Block 76 (Mexico), 78 (Bermuda, Central America and West Indies), and an alphabetical list for whole continents by stations. *Subject Headings:* **1. International station numbers 2. Synoptic networks 3 Manuals 4. North America.**—*M.R.*

12L–63 551.509.21

*U. S. Weather Bureau, **Daily Upper Air Bulletin.** Listing of North American aerological observations prepared from unchecked teletype information and published for immediate reference use, New Series, No. 1, Dec. 1, **1954.** 81 p. Entirely tables. Hectographed. "This issue marks the resumption of publication of bulletins of the same title published by the U. S. Weather Bureau during Aug. 13, 1948–Oct. 31, 1949, and by the U. S. Navy Fleet Weather Central during April 3, 1950–June 30, 1954." **DWB**—A hectographed listing of all the pilot balloon, rawinsonde and radiosonde data as transmitted over the teletype circuits for all of North America, for the particular day. Data are in crude form and hence not corrected or verified. *Subject Headings:* **1. Daily weather bulletins 2. Upper air data 3. North America.**—*M.R.*

12L–64 551.509.21:621.396:058.7(73)

U. S. Weather Bureau, **Director of weather broadcasts, 1955.** pub. Wash., D. C., May 17, **1955.** (18 p) Annual. Title varies: 1946–1947, as **Schedule of weather broadcasts. DWB**—In 1946–1947 weather broadcasts were made from 82 cities in 37 states. In 1955, 404 stations in 48 states, Alaska and Puerto Rico are listed. Many cities have broadcasts from a number of stations (e.g. Miami from 10 stations). The directory lists alphabetically by states and cities the radio stations which have installed microphones in nearby Weather Bureau Offices, or which have broadcasts on regular schedule by W. B. personnel. Call letters, frequencies and power of stations are given. *Subject Headings:* **1. Weather broadcasting directories 2. United States.**—*M.R.*

12L–65 551.509.21

U. S. Weather Bureau, **Notes about the Daily Weather Map.** Its *L.S.*, 5601, Jan. 1, **1956.** ig. **DWB**—Sample of Washington, D. C. weather map (reduced) and comments on price $7.20 year, or $21.90 air mail), time of issue and contents. *Subject Headings:* **1. Daily weather maps 2. Washington, D. C.**—*M.R.*

12L–66 551.509.21

*Vietnam. Ministère des Travaux Publics et des Communications, **Bulletin Météorologique Journalier** [Daily meteorological bulletin], Aug. 1.31, **1957.** 31 charts 43 × 33 cm. Table in margin. Publication is current. **DWB** (M09.2/596 Y666b)—This daily synoptic bulletin contains data in tabular form for 16 stations in Vietnam, Laos and Cambodia, and plotted data (with isobars for every 2 mb) for India, Southeast Asia, China, Japan, Philippines, Manchuria and the Maritime Provinces of the U.S.S.R. *Subject Headings:* **1. Daily weather maps 2. Daily weather bulletins 3. Vietnam 4. East Asia 5. Southeast Asia.**—*M.R.*

12L–67 551.509.21:621.396

Where to get weather. *Air-Sea Safety,* Washington, D. C., 1(1):57–62, No. **1946.** table. **DWB**—Private pilots without convenient access to an airport are advised to tune in on commercial radio station official weather reports. A schedule (corrected to Nov. 1946) of stations and times of such broadcasts throughout the United States is given. *Subject Headings:* **1. Weather broadcasting 2. Aeronautical meteorology 3. United States.**—*M.P.K.*

12L–68 551.509.21:621.397.8:551.508

Weather on video. *Friez Weathervane News,* Baltimore, 2(8):3, Sept. **1953.** photos. **DWB**—Account of the weather instruments installed in the WBAP-TU studio, Fort Worth, Texas, and of the numerous weather programs presented by that station. *Subject Headings:* **1. Television weather broadcasts 2. Meteorological instruments 3. Fort Worth, Texas.**—*M.P.K.*

PROGNOSTIC CHARTS (551.509.25)

See also: **Short range weather forecasting** (Petterssen), 12L–100; **Verification prognostic charts** (Boville), 12L–510.

12L–69 551.509.25

§Boville, B. W., **300 mb progs—a short method.** *Canada. Meteorological Branch, GIR-2990,* EC-260, Nov. 27, **1957.** 9 p. 6 figs., 5 refs. **DWB, DLC**—This report discusses, with the

aid of an example, a method of obtaining 300 mb progs using only synoptic surface and 500 m progs with slight changes of 500 mb and 300 mb relationships of the previous day. Jet streak and isotachs are also forecast satisfactorily by this method. *Subject Headings:* **1. 300 mb prognostic charts 2. Jet stream forecasting.**—*E.K.*

12L–70 551.509.

Gardner, J. M., **Notes on making prog charts.** *Trans World Airlines, K. C. Missou Meteorological Technical Bulletin,* No. 51–3, June 11, **1951.** 3 p. fig. **DWB**—Use of consta acceleration of isobar-isotherm systems for all but mature troughs leads to better prognosis upper level systems. Experience in the Pacific Coast-Alaska area is cited in this respe *Subject Headngs:* **1. Prognostic chart preparation 2. Pacific Coast-Alaska.**—*M.R.*

12L–71 551.501.5:551.509

§Wirkus, Feliks (*State Hydrological and Met. Inst., Warsaw*), **A graphical method of co structing 1000 mb prognostic contour charts.** *Acta Geophysica Polonica,* Warsaw, 7(3/4 442–466, **1959.** 15 figs., 11 refs., 23 eqs. Polish summary p. 466. **DWB, DLC**—Several grap methods of constructing 1000 mb prognostic contour charts are examined critically. The aut concludes: An error (assessed) arises in computing local height changes of the 1000 mb isoba surface through graphical integration with respect to the time term $Vs\text{-}\nabla Zo$, when Vs is geostrophic wind velocity corresponding to the height field of a certain isobaric surface, and is assumed that Vs does not change in time. Assumption $\partial ZL/\partial t = 0$ leads to erroneous eval tion of the influence of thickness (mean temp.) advection of the layer from Po to Pv on lo height changes of surfaces Po. The error may be reduced by using the much less variable time velocity field steering the 1000 mb surface, which consists of the sum of the height field the isobaric surface at the nondivergence level, and the height steering the movement of vorticity centers at the nondivergence level, used in Fjortoft's graphic method. Prognostic cha are given for Jan. 10, 1958, Jan. 11, 1958, Aug. 1 and 2, 1958. Contours for the actual field these dates are included. *Subject Headings:* **1. Prognostic chart preparation 2. Prognos contour charts 3. 1000 mb prognostic charts**—*E.Z.S.*

SYNOPTIC METEOROLOGY (551.509.2/3)

12L–72 551.509.2/3:001.4(9

Baranov, N. P., **Nekotorye zamechaniia o terminakh sinopticheskoĭ meteorologii.** [R marks on terms used in synoptic meteorology.] *Meteorologiia i Gidrologiia, Leningrad,* No. 5 **1958.** 2 refs. **DWB, DLC**—The author cites examples of the inadequacy of current Rus terminology in the synoptic literature. Russian writers say that "an anticyclone formed masses of cold air" when they should say "from masses of cold air" (the former expressio suitable in German but not in Russian). The expression "ridge (spur) of high pressure" "core of high pressure" as if there is a ridge or core of low pressure, is incorrect. Other err ous and inaccurate expressions in use by Russian meteorologists are cited. *Subject Headi* **1. Terminology 2. Russian language.**—*I.L.D.*

12L–73 551.509

Bugaev, V. A. and Petrosiants, M. A. (*eds.*),**Sinopticheskaiâ meteorologiia.** [Syn meteorology.] *Sredneaziatskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Tr* No. 1(16), **1959.** 179 p. figs., tables, refs., eqs. (For listing of articles (abstracted separa *see* Pt. III, V. 12, No. 6, June 1961, *Met. Abs.*) **DWB** (M(055) U581ts)—This collection tains articles dealing with the equations of motion, suitable for numerical integration in we forecasting and also a series of articles on the regional synoptics of Central Asia. The ch teristics of analysis in mountain and desert regions and forecasts of different weather pheno are examined. Individual articles describe conditions of the appearance of planetary high alt frontal zones also jet stream flow over Central Asia. *Subject Heading:* **1. Synoptic meteoro** —*Transl. of annotation* (*I.L.D.*).

12L–74 551.509.2/3:

Il'inskii, O. K., **Soveshchanie po regional'noĭ sinoptike Dal'nego Vostoka.** [Meetin the regional synoptics of the Far East.] *Meteorologiia i Gidrologiia,* Leningrad, No. 3:7 March **1958. DWB, DLC.** Transl. issued as U. S. Joint Publications Research Service, T lation 5-490-N, available U. S. Office of Technical Services as its 59-13002. Price: $0. A conference on the regional synoptic meteorology of the Far East was held in Vladivostok d Nov. 23–26, 1957. Reports by directors of hydrometeorological services in this region were sented, the names of the individual directors are listed. In contrast to other areas o

U.S.S.R. the synoptic meteorology of the Far East has not been sufficiently investigated. It was suggested that the synoptic and aerological investigations of the Far East Institute of Hydrometeorology should be devoted to the study of the laws of atmospheric circulation, to experimental studies on methods of forecasting of low clouds, fogs and atmospheric turbulence, etc. During the past several years the Sakhalin Hydrometeorological Service performed outstanding synoptic work. *Subject Headings:* **1. Synoptic meteorology 2. Synoptic meteorology conferences 3. Far East.**—*I.L.D.*

12L–75 551.509.2/3

Jansá Guardiolo, José Maria (*Palma de Mallorca*), **La dynamique apparente de la météorologie synoptique.** [Dynamics as related to synoptic meteorology.] *International Association of Meteorology, Brussels, 1951, Procès-Verbaux des séances: Mémoires et Discussions,* Pub. **1953.** p. 157. **DWB**—Dynamic considerations about the deformation of pressure systems are briefly discussed in relation to various map projections. *Subject Headings:* **1. Synoptic meteorology 2. Map projection.**—*A.A.*

12L–76 551.509.2/3:551.501:551.510.7

Lugeon, Jean (*Dir. Swiss Inst. of Meteorology*), **Météorologie synoptique.** [Synoptic meteorology.] *Industries Atomiques,* (Paris? Geneva?), No. 1/2, **1959.** Reprint of 4 p. port., photos, chart. **DWB** (M10.7 L951me)—Synoptic meteorology and permanent surveillance of the natural and artificial content of radioactive substances in the air are briefly discussed. Photographs and descriptions of equipment for measuring and detecting radioactivity and a short biography of the author are included. *Subject Headings:* **1. Synoptic meteorology 2. Atmospheric radioactivity.**—*I.S.*

12L–77 551.509.2/3(438)

Rafałowski, Stanisław (*PIHM, Warsaw*), **Stan i rozwój meteorologii synoptycznej w Polsce (streszczenie).** [State and development of synoptic meteorology in Poland.] *Przegląd Geofizyczny,* Warsaw, 4(3/4):270–271, **1959. DWB, DLC**—A rather pessimistic report in which the author points out the lack of noticeable progress in the development of the synoptic service in Poland which had to be organized anew after the reactivation of the State Hydrological and Meteorological Institute in 1945. However, important improvements have taken place in the last few years due to increased demands for more precise meteorological information and the development of aerology and the use of calculating machines. The lack of educated and experienced weather forecasters is also stressed. *Subject Headings:* **1. Synoptic meteorology 2. Poland**—*A.M.P.*

12L–78 551.509.2/3(540)

Weather, winter season January–February 1954. *Indian Journal of Meteorology and Geophysics,* Delhi, 5(3):281–283, July **1954.** fig. **DWB**—Description of main features of synoptic weather for the two months, with a large map showing rainfall anomalies for period, Jan. to Feb. 28, 1954. Gust excess in N. Central and NW India and great deficiency in Southeast and South Central and Southwest provinces. Two cold spells occurred in January. *Subject Headings:* **1. Synoptic meteorology 2. Rainfall anomalies 3. India.**—*M.R.*

BASES AND METHODS OF FORECASTING (551.509.3)

12L–79 551.509.3:517.6:681.14:621.38

General Electric Company. Computer Dept., Phoenix, Ariz., **Weather Observing and Forecasting System 433L. A proposal to AMC-ARDC-MATS-Source Selection Board.** April 20, **1959.** 22 p. 10 figs. **DWB** (M09.3 G326we)—A copy of a proposal submitted to the AMC-ARDC-MATS Source Selection Board by various components of the General Electric Co. and Allied Research Associates, Inc. This proposal provides for a service to the Government which will integrate the physical components of a test network with certain techniques of data handling and data processing which will lead to a System Design encompassing all the required aspects of the 433L Project. This System Design is the terminus of an extensive test plan involving the entire test network and will include the installation, operation and evaluation of input devices; testing, integration and analysis of meteorological analysis and forecasting; data processing equipment, data processing and data handling techniques and display equipment. This proposal covers, in detail, the work to be performed toward the establishment of the Prototype System, and covers only the first year of contractual responsibility. *Subject Headings:* **1. Forecasting techniques 2. Forecasting system 433L 3. Weather analysis.**—*E.Z.S.*

12L–80 551.509.3(52–1

Gōda, I., **On the continuous bad weather over Western Japan in summer seaso** *Journal of Meteorological Research*, Tokyo, 10(12):993–1009, Dec. **1958.** 16 figs., 2 tables, refs. In Japanese; English summary, p. 993. **DWB, DLC**—In this paper the author examin the synoptic characteristics of the continuous bad weather, i.e., the "base" of bad weather, ov western Japan in summer season, using 5-day mean contours and isanomals at 50 mb level f the northern hemisphere during the period 1954 to 1957. The bad weather trend in weste Japan for the summer season during the period 1956 to 1957 was discussed by using some co tinuity charts at 500 mb level; i.e., variation of zonal index, zonal and meridional variations contour anomaly and so forth. Furthermore, the author examined the synoptic and statistic indications for forecasting the ending of Bai-u, using 5-day mean contours, isanomals and so continuity charts at 500 mb level during the period 1951 (or 1956) to 1957. The results are shown in figures. *Subject Headings:* **1. Synoptic conditions over western Japan 2. Fo casting ending of Bai-u 3. 500 mb charts 4. Western Japan.**—*Author's summary.*

12L–81 551.509.3:681.14:621

Holl, Manfred M., **Weather prediction by calculation.** *Stanford Research Institute, S Journal*, 3:61–66, **1959.** figs.—Describes the efforts made to improve weather forecasts. I weather prediction an accurate knowledge of atmosphere and the laws according to which atm pheric changes occur are necessary. In the early 20's the numerical procedures were introduc After the second World War high speed electronic computers made the task easier. There much yet to be learned about the factors influencing weather. In future years automation is go to play an important role in weather prediction. *Subject Headings:* **1. Weather forecasti methods 2. Numerical forecasting 3. Electronic computers**—*A.H.K.*

12L–82 551.509.3:517.6:681.14:621

International Business Machines Corporation, N. Y., **433L system integration manageme Vol. 1, Management and technical proposal.** N. Y., April 24, **1959.** 36 p. 15 figs., cl (fold.), table. On t-p.: RFP 30-635-59-4512. **DWB** (M09.3 161fo)—This is a copy o proposal for the integration management of the Weather Observing and Forecasting System the members of the IBM team selected by the International Business Machines Corp. The posal consists of three parts. In the first part their System Integration Management Plan described. Their technical approach is explained in the second part. Pertinent manpower budget information are discussed in the third part. *Subject Headings:* **1. Forecasting sys 433L 2. Forecasting techniques.**—*E.Z.S.*

12L–83 551.509.3:0

Melpar, Inc., Boston, **Proposal for integration of Weather System 433L.** Submitte response to Rome Air Materiel Area request for 433L ESSPO, Murphy Facility, Waltham, M April 22, **1959.** 53 p. 8 figs., 5 tables. Laid in pocket: 15 p. brochure on **Personnel related experience. DWB** (M09.3 M528pr)—The proposed managerial and technical details the integration of Weather System 433L as contained in this communication are presente response to Rome Air Materiel Area Request for Proposal No. 30-635-59-4512. The functi organization of the new system includes a meteorological laboratory that will be responsible selection, automation, and tailoring of analysis and forecast techniques. The meteorological O tions Branch will be concerned with requirements for weather information and problems atte to the supplying of user needs in appropriate form. This branch will be staffed by a relat small group of experienced meteorologists. The entire system will offer a strict inter-sy integration in all the fundamentals, functional and administrative. Details of the proposal included. *Subject Heading:* **1. Forecasting system 433L.**—*N.N.*

12L–84 551.509.3:681.14:6

U. S. Electronic Support System Project Office (433L), **Joint weather observing and casting system 433L: status report No. 1.** (Wash., D. C.), Dept. of Defence, Dept. of merce, Federal Aviation Agency, April **1960.** 13 p. **DWB** (M09.3 U5624st)—This first s report covers the period beginning Oct. 8, 1959, when the contract was signed to April Much of the work to date has been devoted to specific planning of the test program and pre tion of equipment and facilities for the test. Forecasting technique development work and liminary system analysis studies are also under way. In this report discussion is divided int major sections: 1) program for system integration; 2) weather observing subsystems; 3) processing subsystem; 4) data transmission subsystem; 5) display and distribution subsystem 6) the NAF5C program. *Subject Heading:* **1. Forecasting system 433L.**—*I.S.*

12L–85 551.509.3:551.515.23

Oka, C. and Ueki, K., **On the prediction of typhoon track by 700 mb chart.** *Journal of Meteorological Research,* Tokyo, 10(7):591–595, July **1958.** 18 figs., ref., 2 eqs. In Japanese. **DLC**—The method of prediction of typhoon tracks by using the 700 mb chart for 24 hour periods is discussed with a sample case study which took place in 1956. Operational steps involved in the prediction, correction by Z_o, the method of determination of the position (direction and velocity) after 24 hours with correction by Z_o are discussed. Diagrams are included. The forecast method is actually effective for 15 hours since data processing takes 7–8 hours. *Subject Headings:* **1. Typhoon track forecasting 2. 700 mb charts.**—*J. H. Woo.*

12L–86 551.506:551.507.2:551.509.3

Prügel, H., **Erfahrungen im Wetterdienst an Bord.** [Experiences in the weather service on shipboard.] *Wetterlotse,* Hamburg, No. 134:164–173, Aug. **1958.** 2 figs. **DWB**—Some suggestions are derived from shipboard observations on M.S. "Erlangen" during her journey to the east coast of North America in the summer of 1957. These concern necessary corrections using inadequate instruments and evaluations of weather charts, and show also the value of shipboard observations for the analysis of weather forecasts of the European coastal area. Among the most important considerations of the observation service were the following: advantage of the aneroid barometer over the mercury barometer, deviations of fixed thermometers from the temps. prevailing outside of the ship, estimation of visibility by radar, training of younger officers by older ones in estimating wave heights, reporting of every unexpected observation or those divergent from an official weather forecast. *Subject Headings:* **1. Marine weather services 2. Marine weather forecasting.**—*O.T.*

12L–87 551.509.3:551.513.2:551.515.83

§Serra, Adalberto (*Met. Service, Brazil*), **O princípio de simetria (circulação secundária no Hemisfério Sul).** [The principle of symmetry: secondary circulation in the Southern Hemisphere.] *Rio de Janeiro, Serviço de Meteorologia,* **1960.** 41 p. 627 figs. Mimeo. Also shorter English version **Principle of symmetry,** issued Rio de Janeiro, **1958.** 14 p. chart, 11 refs. Mimeo.—The principle of symmetry of polar front movements is explained in the 1958 publication and elaborated in the second publication, 1960. The new principle of weather analysis for forecasting in Brazil is based on a comparison between Northern and Southern Hemispheric circulation. The principle appears to be demonstrated by the analysis of daily charts. An explanation of the tropical isobar displacement is presented through detailed studies of several regions: the American area, Atlantic area, Africa and the Indian and Pacific Oceans. It is concluded that western and eastern hemisphere charts are more useful for forecasting purposes than the present maps. The period of study was during June, July and Aug. 1954. Data from Argentine, Brazil and Chile were used for analysis. *Subject Headings:* **1. Forecasting methods 2 Hemispheric circulation 3. Polar front movements 4. Brazil 5. Argentina 6. Chile.**—*E.Z.S.*

12L–88 551.509.3(262)

Sutcliffe, R. C., **Basic problems of weather forecasting with special reference to the Mediterranean.** *Berlin. Freie Universität. Institut f. Meteorologie und Geophysik, Meteorologische Abhandlungen,* 9(1):119–123, **1960.** English summary p. 15–16. **DWB**—Forecasting for the Mediterranean is in many respects exceptionally complicated and difficult. As a basis for discussion of the most promising methods of increasing the accuracy of forecasts it is useful to analyze the general problem and consider the different methods of attack. A completely general hydrodynamical approach to the prediction of the state, structure and behavior of the atmosphere is impossible because of the unlimited complexity and the infinity of degrees of freedom. The practical approach is to distinguish different types of behavior as separate idealized problems, to deal with each by appropriate approximate methods and then, in forecasting practice to allow for their interactions by any methods available—depending at present largely on expert judgment. In almost every general short-range forecast several types of behavior are in fact separately considered. *Subject Headings:* **1. Forecasting techniques 2 Short range forecasting 3. Mediterranean.**—*Author's abstract.*

12L–89 551.509.3:551.513

Ueki, K., **Investigation on the forecasting rules and techniques, Pt. 1.** *Journal of Meteorological Research,* Tokyo, 11(1):28–43, Jan. **1959.** 25 figs., 8 tables, 3 refs. In Japanese; English summary, p. 28. **DWB, DLC**—In this paper, the technique for the purpose of measuring the asymmetry of circumpolar currents on the basis of La Seur's supposition is discussed by using 700 mb Northern Hemisphere maps. It is a new idea that the forecasting rule in the colder season of the weather trend variation is made by substituting the inclination of cold dome for the

asymmetry of circumpolar currents and its movement (the so-called action main stream). Th author has produced the schematic representations of the movement of cold dome in the neighbor hood of the north pole and has explained that gusty type, cold and warm periods in the colde season are characterized by the position and travelling direction of action main stream. *Subjec Headings:* **1. Forecasting techniques 2. 700 mb charts 3. Cold dome movements 4 Northern Hemisphere.**—*Author's summary.*

12L–90 551.509.3:551.511.1:551.515.

Ueki, K. and Yamaguchi, S., **Investigation on the forecasting rules and techniques, Pt. 2** *Journal of Meteorological Research,* Tokyo, 11(12):976–985, Dec. **1959.** 18 figs., 6 refs. I Japanese; English summary p. 976. **DWB**—In this report the authors examine the following two problems: (1) In the first report, one of the authors pointed out that the inclination an movement of the cold dome from a standpoint of the asymmetry of circumpolar currents-actio main stream-were closely connected with the specific severe weather in the colder season. In thi report, the authors examine, in the same method, what sort of influence the action main strea has on the weather trend in the warmer season between April and Sept., 1958. (2) Inspectin $(\partial T/\partial z)_{100-300}$ charts for finding the effect of instability, the authors observe that typhoons ar apt to move toward the instability area. *Subject Headings:* **1. Forecasting typhoons 2. Japa** —*Authors' abstract.*

12L–91 551.509.3:551.576.2:551.591.

Wan, P. K., **Recent development of objective forecasting. Meteorological Bulleti** Taipei, Formosa, 2(3):25–31, Sept. **1956.** 5 figs., tables. In Chinese. **DLC** (Orientalia)— A review and discussion of the book, **Some Techniques for Deriving Objective Forecastin Aids and Methods** *published by U. S. Air Weather Service* (*see* 7.11–23, Nov. 1956, *Met. Ab* (April 1953) and revised in April 1955, for use as a textbook by weather forecast technician and superintendents. The contents include definitions of forecasting terms, selection of facto concerned, proper analysis and arrangement of data, description of processes by a concise metho and consideration of the effectiveness for key factors. The revised edition, however, contain different contents than the original, such as an intended problem on the forecasting and pro lematical factors to be described by an intensive method. Also contains, shows some illustratio of how to draw a scatter diagram, how to examine a forecast checklist and how to formulate deviation skill score. The correlation between cloud-cover and visibility by airplane has utilize the Andrews Air Force Base as an illustration. *Subject Heading:* **1. Objective forecastin methods.**—*K.C.*

12L–92 551.507.362.1:551.576.1:778.3:551.509.

Wetterfront zusammenhängend photographiert. [Weatherfront photographed contin ously.] *Weltraumfahrt,* Frankfurt a.M., 10(2):67–69, June **1959.** 4 figs. **DLC**—New pos bilities of weather forecasting with the help of rocket photography of cloud formations, carri out at Wallops Island are described. The observations were made at an altitude of 140 km. T photocameras were of 16mm with a shutter speed 1/2000 and were able to make a picture in second. The paper, in the second half discusses Wallops Island in connection with the vario kinds of experiments carried out in this station. Referring to the different projects, the scienti use of inflated aluminum coated balloons for meteorological purposes is presented. *Subject Hea ings:* **1. Cloud formation photography 2. Forecasting techniques 3 Wallops Island, Va** *E.K.*

12L–93 551.509.3:551.513(213)

†Riehl, H., **Navy improvement in forecasting.** Chicago: University. Dept. of Meteorolo Contract N6ori-02036, Final Report, Oct. 1, 1951–Sept. 30, **1959.** 4 p. **DWB** (M57.2 C532fi) Of the variety of scienctific studies encompassed in this project, three are prominent: 1) tropi circulations, especially hurricanes and typhoons; 2) general circulation of the tropics and coupli between low and high latitudes; and 3) jet streams, especially in the subtropics. All project p sonnel were stationed in Florida during two hurricane seasons: in 1953 at the Marine Corps Station, Opalaca, in conjunction with the U.S.N. Fleet Weather Central, then located there; 1958 at the National Hurricane Research Project Headquarters in West Palm Beach. The w from this project, published in report form, was given to recognized journals for wide dissemi tion. A list of the articles published, giving authors, title, and journal is included. A list 22 articles including the three main topics mentioned above is given. The journals most of referred to are: *A.M.S. Bulletin* and *Journal; R. M. S. Quarterly Journal; Tellus* and *Geophys Subject Headings:* **1. Tropical circulation 2. General circulation 3. Jet streams 4 Fo casting methods.**—*A.J.M.*

12L–94 551.509.313:551.509.325

Meteorological Office discussion [on] objective methods of local forecasting. *Meteorological Magazine,* London, 88(1045):207–218, July 1959. 3 figs., 6 tables, 7 refs. **DWB**—A report of the meteorological office discussion at the Royal Society of Arts, held on Monday, March 16, 1959, on "objective" methods of local forecasting. A paper, graphically illustrated, was read by M. H. FREEMAN reporting the development of an eleven parameter model for objective forecasting of visibility by D. H. JOHNSON. This model became the model of authors' own investigations in this field. This attempt mainly was to simplify JOHNSON's scheme. Two resultant methods are reported. Freeman's five parameter objective forecast, or F forecast, and M forecast; a modification of the Freeman system using the "meteor" electronic computer. The three systems were tested and compared. The results are tabulated. It is concluded that, on the whole, the three objective forecasts are better than the subjective forecasts, the "meteor" system being the best and with little to choose between the T and F methods. A brief summary of the comments made on this paper by thirteen scientists in presented at the end of the report. *Subject Headings:* **1. Objective forecasting 2. Local forecasts 3. Visibility forecasts.**—*I.S.*

12L–95 551.509.3:681.14:621.38

Byers, Horace R. (*Univ. of Chicago*), **Chairman's prefatory remarks (to Symposium on Modern Concepts in Meteorology, National Academy of Sciences, April 27, 1955).** *National Academy of Sciences, Wash., D. C., Proceedings,* 41(11):797–798, No. 15, 1955. **DWB**—An introduction to four papers dealing with the application of electronic computers to weather forecasting with a theoretical or a statistical approach, the history of objective forecasting and the insignificance of artificial ingredients, in modifying weather on a large scale. *Subject Headings:* **1. Objective forecasting 2. Numerical forecasting 3. Weather modification 4. Electronic computers 5. Meteorology symposia.**—*A.A.*

12L–96 551.509.3:629.13

U. S. Air Weather Service, **Report on Task Force Weather Central activities during Operation Greenhouse.** Its *Technical Report,* No. 105–88, March 1952. 38 p. charts (some fold.), foot-refs. **DWB** (M(055) U58a)—During the planning and operation of Operation GREENHOUSE the Air Force and Navy forecasters on Eniwetok were confronted with some meteorological problems. These problems have been summarized in this report. It also includes planning, concepts, the weather data, the analysis of the charts involved, and the basic forecasting techniques used. Some general remarks and conclusions about forecasting in the Eniwetok area are made. *Subject Headings:* **1. Forecasting techniques 2. Operation GREENHOUSE 3. Eniwetok Island.**—*N.N.*

12L–97 551.509.3

Kamiko, T., **On the analysis of index cycle and application of angular momentum transport theory to the prediction of zonal index.** *Journal of Meteorological Research,* Tokyo, 8(9): 600–604, Oct. 1956. 4 figs., 3 tables, 6 refs., 7 eqs. In Japanese. **DWB, DLC**—This paper presents the result of wind profile and index cycle analyses on the basis of the angular momentum theory, considering the judgment of its trend and umkehr-effect in the seasonal change are unpredictable in forecasting. The calculation of zonal index was based on 700 mb at noon every day in 120–160°E and all the indices were converted into three-days' mean value. In this way the monthly index of the distribution of each scale (total scales are 5) at 100 ft./10° latitude was tabulated for the period of 1952–1954, and, in order to judge the trend by tracing each scale in accordance with relative maximum and minimum, wind profile and index trend were tabulated for the month of May 1955. Then the comparative study between forecasting and real value of observation of zonal index at 45°N (500 mb weather chart) for Oct. of 1954 was carried out by equations as illustrated. It is concluded that the errors in both were not in disagreement; and the forecasting of zonal index (mostly on trough) would be no problem at all if the horizontal flow of relative angular momentum is calculated accurately. *Subject Headings:* **1. Zonal index forecasting 2. Angular momentum calculations.**—*K.C.*

12L–98 551.509.3:519.24

Čehak, K. (*Vienna*), **Die Verwendung von orthogonalen Polynomen in der Meteorologie.** [Application of orthogonal polynomials in meteorology.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* Vienna, 12(1):40–61, 1960. 4 figs., 4 tables, 16 refs. German, English and French summaries p. 40–41. **DLC**—The field of heights of the 850 mb-surface above Central Europe and the North Atlantic is represented in a grid of 45 points by means of orthogonal polynomials (Techebycheff-polynomials). A general discussion is given concerning which of the possible applications of this kind of representation shall further be investigated, i.e., first of all the objective classification of large scale weather situations (Grosswetterlagen), statistical forecasts

(especially medium range forecasts), and the application in numerical weather prediction. As a example of this representation, the various of polynomial coefficients are given for the transitio of a pressure field from zonal to meridional and back to zonal. *Subject Headings:* **1. Orthog onal polynomials 2. Large scale weather situations 3. Statistical forecasts 4. Numerica forecasting 5. Forecasting techniques.**—*Author's abstract.*

FORECASTS FROM DAILY SYNOPTIC CHARTS (551.509.31)

See also: **The weather map** (American Technical Society) 12L–48.

12L–99 551.509.3

Kujirai, K. (*comp.*), **On the change of weather on September 22–23, 1956.** *Journal o Meteorological Research,* Tokyo, 9(7):503–507, July **1957.** 10 figs., tables, eqs. In Japanese English summary p. 503. **DWB, DLC**—This is the the summarized report of the discussions the meeting of forecasters from the stations in the coastal regions of the Kanto district in Noven ber, 1956. From 22nd to 23rd Sept., 1956, rainy weather changed to fine weather very rapidl and it was studied in detail by using the following charts and computations: 1) Continuity cha (daily 700 mb height and 6°C isotherm), 2) 24-hour change of $\bar{z}-4z$ value, 3) Continuity cha (3-day mean 700 mb height), 4) 5-day mean 500 mb contour, 5) Meridional change of 10,0 foot contour on the 700 mb at surface 60°E longitude, 6) Daily map. In this example, a per odicity was found, so that extrapolation would be effective. *Subject Headings:* **1. Forecastin techniques 2. Kanto District, Japan.**—*Author's abstract.*

Short Range Forecasting (551.509.31)

12L–100 551.509.31:551.509.

Petterssen, Sverre (*Dept. Met., U. of Chicago*), **Present position and future prospects fo short-range weather forecasting.** *National Conference on Applied Meteorology, Hartford, Con Oct. 1957, Proceedings,* issued **1957.** Section achievements which led to the development of t objective methods of physical and statistical forecasting are mentioned. Results of a comparis of accuracies of subjective (U. S. Weather Bureau) and objective prognostic charts are referr to in general terms. *Subject Headings:* **1. Short range forecasting 2. Prognostic charts.**—*G.*

12L–101 551.509.31:551.55(93

Kerr, I. S. and Browne, M. L., **Short range forecasting of southerly wind changes Paraparaumu.** *New Zealand. Meteorological Office, Technical Note,* No. 82, Feb. 29, 19 2 p. graph. **DWB**—A prediction diagram is developed for determining whether a wind cha to a southerly quarter observed over the South Island will reach Paraparaumu. *Subject Hea ings:* **1. Short range forecasting 2. Wind deviation 3. Paraparaumu New Zealand.**—*Autho abstract.*

12L–102 551.509.31:551.513.2:551.51

Reed, Richard J., **Cold polar vortices.** (In: McGill Univ. Arctic Meteorology Resear Group, **Contributions to the study of the Arctic circulation.** Scientific Report No. 7 on Contract AF 19(604)-1141, March 1958. p. 60–68. 8 figs., table, 6 refs.) **DWB**—A disc sion of the climatology, structure and mechanics of cold polar vortices and of the problem of fo casting the movement of these systems. Cold lows are common in all parts of the Arctic dur the cold season; vigorous polar lows occur with great frequency. During the cold season w developed lows are characterized by central temperatures of −45°C to −50°C and a central hei of 16000 ft; corresponding figures for the warm season are −30°C and 17000 ft. At all seas polar lows have long life spans. Near the surface, temperatures in the region of the cold l may be warmer or colder than in the surrounding regions, depending upon the degree of clou ness. Throughout the rest of the troposphere temperatures in the interior are distinctly cold Usually stratospheric temperatures are warmer at the core. Definite frontal structure is of lacking between a cold low and its surroundings. A suggested mechanism for the origin maintenance of cold polar vortices involves the conversion of potential into kinetic energy peripheral regions by wave-like or baroclinic disturbances. A correlation of the movement cold lows forecast by the Fjørtoft method with observed movement indicates that while numerical forecasts in the Arctic are not as successful as in regions of more plentiful data, results are sufficiently promising to suggest that useful forecasts may be obtained on many oc sions. A table giving a summary of correlations between 24 hr observed and predicted 500 height changes (Fjørtoft method), a schematic diagram of a cold low showing isentropes, tro pause and normal isotachs and synoptic charts, are presented. *Subject Headings:* **1. Cold vorte 2. Forecasting cold lows 3. Fjørtoft method.**—*I.L.D.*

Synoptic Analysis (551.509.31)

12L–103 551.509.31:551.515.8(98)

Godson, Warren L., **Problems of Polar analysis: a discussion of modern Canadian analytical procedure.** (In: Russell, Pamela and Ballabon, M. B. (*eds.*),**Informal papers in Arctic meteorology.** McGill Univ. Arctic Meteorological Group, Contract AF 19(604)-1141, Scientific Report, No. 1, Dec. 15, 1955. p. 21–27. 9 charts (colored), table, 3 refs.).—The Canadian philosophy of analysis of the large scale thermal structures of the atmosphere is based on an atmospheric model of three fronts and four air masses. The author discusses briefly the basic properties of air masses and fronts, the various features of frontal topography, namely trowals (trough of warm air aloft), upper cold and warm fronts, cold domes and warm pockets and the integration of four dimensional frontal analysis into general synoptic analysis. *Subject Headings:* **1. Arctic air masses 2. Arctic fronts 3. Synoptic analysis 4. Arctic**—*I.L.D.*

12L–104 551.509.31:551.515.8(98)

Reed, Richard J., **Arctic synoptic analysis.** (In: McGill Univ. Arctic Meteorology Research Group, **Contributions to the study of the Arctic circulation.** Scientific Report No. 7 on its Contract AF 19(604)-1141, March 1958. p. 48–59. 8 figs., 3 refs.) **DWB**—The classical conception of the frontal problem and the wave theory of cyclones as formulated by BERGERON is contrasted with the modern outlook on fronts and the effects of each on synoptic analysis are discussed briefly. The author then outlines the procedure of isobaric analysis and the characteristics of cyclonic behavior in the Arctic, and discusses the problem of the existence of true fronts in the Arctic and the evidence for the existence of the so-called "Arctic Front." It is pointed out that no special methods are required for Arctic analysis; that fronts of all sorts appear in the Arctic but they are not as frequent and as distinct as in middle latitudes, and that the term "Arctic Front" is too general. Graphs showing sounding and hodograph for Eureka, Ellesmere Island (0300 *z* 21 March, 1955) and atmospheric cross section from Point Barrow, Alaska to Fort Smith, Canada (1500 *z* 18 Aug. 1955), and surface and 500 mb charts for different periods are presented. *Subject Headings:* **1. Synoptic analysis 2. Arctic fronts 3. Arctic cyclones 4. Eureka, Ellesmere Island 5. Point Barrow, Alaska 6. Fort Smith, Canada 7. Arctic.**—*I.L.D.*

12L–105 551.509.31:551.515.2(265/266)

LaSeur, Noel, E., **Final Report on Contract AF 19(604)-753 of Florida. State Univ. Dept. of Meteorology, July 31, 1959.** 21 p. 23 refs. **DWB** (M15.2 F636f)—Structure, analysis and forecasting of synoptic scale weather systems as well as the relations of these characteristics to the formation, movements and dissipation of storms in the tropical Atlantic region are summarized. The analysis program provides detailed information on the magnitude and nature of local effects at various stations, on the flow patterns and the statistical properties of the wind data. *Subject Headings:* **1. Synoptic analysis 2. Tropical Atlantic Region.**—*N.N.*

12L–106 551.509.31:551.515.1:551.542

§Malkowski, G. (*Inst. of Met. & Geophysics, Freie Univ., Berlin*), **Zur Häufigkeit von Druckgebilden in der Bodenkarte.** [Frequency of pressure formation on a surface chart.] *Meteorologische Rundschau,* Berlin, 12(5):158–160, Sept./Oct. **1959.** 3 figs., 2 tables, ref. German summary p. 158. **DWB, DLC**—Surface charts from 1953–1958 were studied in order to determine whether there is a constant or near constant frequency of highs and lows from year to year. The maximum occur in the summer months, the minimum in the winter months. The total number ranges from 7232 to 7732. *Subject Headings:* **Pressure formation frequencies 2. Surface weather charts 3. Synoptic analysis.**—*E.Z.S.*

12L–107 551.509.31:551.515(265/266)

§Philpott, L. B., **A winter storm in the sub-tropical South Pacific.** *Marine Observer,* London, 29(186):183–188, Oct. **1959.** 5 figs. **DLC**—These notes from the Director of the New Zealand Meteorological Service explain the meteorological logs of S.S. "Devon" and M.V. "Surrey" during 15–18th July 1958. Several low pressure centers were observed from west to east in the area lying just south of Fiji, Tonga and the Cook Islands. Synoptic charts for this area are included. The report illustrates the fact that there are some less severe winter depressions in the sub-tropical latitudes of the southwest Pacific. It is of interest to note that the two airmasses involved in this storm were separated by a transition zone and not a sharp front. *Subject Headings:* **1. Winter storms 2. Synoptic analysis 3. South Pacific Ocean.**—*N.N.*

12L–108 551.509.31:551.515.8

*Sawyer, J. S. (*Meteorological Office*), **Temperature, humidity and cloud near fronts in the middle and upper troposphere.** *Great Britain. Meteorological Research Committee, M.R.*

Paper, 1064, Aug. 26, 1957. 7 p. table, 9 refs., 2 eqs. **DWB** (M(055) G786m) Also in *Roya Meteorological Society, Quarterly Journal*, 84(362):375–388, Oct. 1958. **[Comments by]** Scorer R. S.; Fleagle, R. G. et al. and **[Reply by]** Sawyer, *Ibid.*, 85(365):295–297, 1959. **DWB, DLC** —Research flights through frontal zones at the 500 and 600 mb levels conducted by the British Meteorological Office between 1951 and 1955 are described and their results presented and discussed. The elements observed during these flights were temperature, frost point and clouds. Data for individual flights are shown graphically and average temperature and frost point profiles are included. The author theoretically considers the relation of fronts to depressions and the jet stream and finds that the temperature gradient observed. at the 500 mb level arises from the differential subsidence of air on the cold side of the jet stram. Conditions at 600 mb confirm earlier findings that the boundary of the frontal cloud mass slopes more steeply than the front itself and intersects the warm boundary of the frontal zone around 600 mb. *Subject Headings:* **1. Frontal analysis 2. Synoptic analysis 3. Tropospheric temperatures 4. Frost point profiles. I. Stagg, J. M. II. Sutcliffe, R. C. III. Harley, D. G.**—*G.T.*

12L–109 551.509.3

§Tahara, J., **An example of remarkable variation of weather trend and forecasting c beginning and ending time by surface weather chart.** *Journal of Meteorological Research* Tokyo, 10(4):358–360, April **1958.** 2 tables. In Japanese. **DWB**—Using surface weathe charts of Tokyo City, the author tried to explain the reason for the variations of weather con ditions of Jan.–March 1954 and of July–Sept. 1956. *Subject Headings:* **1. Surface weather chart 2. Synoptic Analysis 3. Seasonal variations.**—*K.C.*

12L–110 551.509.31:551.515.8(6

Taljaard, J. J., **South African Meteorological problems, Pt. 8, Frontal analysis, the trad front.** *South Africa, Weather Bureau, News Letter*, No. 103:4–6, Oct. 31, **1957. DWB**—Th trade front is defined and illustrated by schematic synoptic charts, followed by notes on the im portant features of this "front" in Australia, West Africa, California and especially in S. Africa It does not occur in S. America because of the high Andes. *Subject Headings:* **1. Trade fron 2. Synoptic analysis 3. S. Africa.**—*M.R.*

Synoptic Case Histories—Synoptic Studies (511.509.31)

12L–111 551.509.31:551.524.

§Andrews, James F. (*Extended Forecast Section, U. S. W. B., Wash., D. C.*), **The weath and circulation of April 1957, a stormy month over the United States characterized by tw contrasting temperature regimes.** *Monthly Weather Review*, Wash., D. C., 85(4):124–13 April **1957.** 8 figs., 3 tables, 11 refs. **DWB, DLC**—The first half of April 1957 was abnormall cold in the eastern half of the USA, the second half was unusually warm. Circulation conditio accounting for these anomalies are analyzed. *Subject Headings:* **1. Temperature anomali 2. Synoptic studies 3. Eastern United States.**—*M.R.*

12L–112 551.509.

Andrews, James F. (*Extended Forecast Sec., U. S. W. B., Wash., D. C.*), **The weather an circulation of October 1958, a month characterized by a pronounced index cycle.** *Month Weather Review*, Wash., D. C., 86(10):408–415, Oct. **1958.** 10 figs., table, 10 refs. **DW DLC**—The average circulation pattern at 700 mb for October 1958 bore a rather strong resem blance to the normal for this time of year. Such differences as did exist were related primari to the intensity of the individual trough-ridge systems making up the planetary wave patte In addition, blocking over central Canada, so prevalent during September, tended to shear t trough in eastern North America and to displace the high-latitude portion eastward to a positi extending from the coast of western Greenland to Labrador. 700 mb heights over the Nor Atlantic associated with this trough were as much as 250 feet below normal. Blocking in centr Canada could also be related to the appearance of a high-latitude ridge in that area, while t major ridge over North America extended from western Canada southward, close to its norm position. Strong ridging in mid-Pacific was associated with a large area of positive anomaly, marked contrast to September when 700 mb heights in the same area were slightly below norm The Low centered over the North Pole in September deepened strongly in October as it mov to the Pacific side of the Pole. The negative anomaly (—420ft.) associated with the polar vor was the largest anomaly of either sign to appear on the mean 700 mb map for October. interest is the fact that the zonal index, a measure of the net geostrophic west wind flow fr 55° to 35°N. in the Western Hemisphere, continued above normal during October. This ind as derived from the monthly mean 700 mb charts, has not been below normal since mid-spr 1958. It is important to note, however, that while the indices for August and September w

oth well above their normal values, October's index was only slightly above normal. This was elated to a pronounced index cycle which occurred during October and interrupted, at least temorarily, the extended period of fast westerlies. *Subject Headings:* **1. Circulation patterns Synoptic studies 3. Zonal index.**—*Author's abstract.*

12L–113 551.509.31:551.515.1(764)

§Chapman, W. T. and Dubofsky, B. (*both, U. S. W. B.*), **Northeastward-moving lows over astern United States, November 14–19, 1957.** *Monthly Weather Review,* Wash., D. C., (85 11):373–382, Nov. **1957.** 6 figs., 6 refs. **DWB**—A synoptic case history study of 3 cyclonic orms whose early history were similar, and which moved from the South Central States toward ie St. Lawrence during Nov. 14–19, 1957. For each storm there are presented 6 surface synoptic iarts, 2–500 mb charts and 2–700 mb advection charts with 1000–500 mb thickness lines and eas of maximum precipitation and maximum vorticity. Simple rules for movement of preipitation areas in relation to advection of cold and warm air and relation cyclonic vorticity are itlined. *Subject Headings:* **1. Synoptic studies 2. Texas cyclones 3. Advection charts Eastern United States.**—*M.R.*

12L–114 551.509.31:551.513.2(5-012)

Nakamura, N., **On the movement of air mass over the Far East.** *Journal of Meteorogical Research,* Tokyo, 7(3):132–142, March **1955.** 10 figs., 2 tables, 5 refs. In Japanese; nglish summary p. 132. **DWB**—The movement of air mass over the Far East is examined sing trajectories of air particles calculated on the sea level weather charts and 700-mb charts. rincipal results are as follows: 1. The trajectories of air mass are obtained by means of eostrophic wind approximation from synoptic weather maps. 2. The monthly mean trajectories air mass on 700-mb level and the representative trajectories of air mass calculated on the sea vel in each month are shown. They have characteristic features corresponding to each season. The standard deviations of distance of each position from their mean positions are calculated r 1, 2 or 3 days before arriving at Sapporo, Tokyo and Kagoshima. The result is useful as e index of dispersion of the trajectories. 4. The conservation of temperature of air mass on 0-mb level are examined by taking the temperature difference of air particle along its trajectory hese results are shown, and the conservativeness of temperature of air mass generally holds good. *ubject Headings:* **1. Air mass movement 2. Synoptic studies 3. Far East.**—*Author's abstract.*

12L–115 551.509.31(420)(494)

Rogers, Peter, **Contrasting Februaries in London and Geneva.** *Weather,* London, 13(11): 9–375, Nov. **1958.** 6 figs., 2 tables, 7 refs. **DWB**—The synoptic and meteorological characristics of the successive Februaries of 1956 and 1957 are analyzed on the basis of weather data r Geneva (Switzerland) and London Airports in order to determine the effect of continentality. bruary 1956 was dominated by easterly airstreams. For most of the month pressure was high er and to the east of the British Isles and low over the Atlantic. The coldest weather of the ar in the British Isles occurred during the first few days of February. Milder conditions, Feb. 9, were succeeded by cold easterlies. In Geneva the continental high pressure persisted until b. 28. Feb. 1957 was characterized by changable westerly conditions in both the British Isles d most of Western Europe. Pressure was considerably below the normal and mild conditions d heavy rainfall prevailed in many areas. In Feb. 1956 the London mean temperature was .9°F (9°F below short period average); the Geneva mean of 21.1°F was 15°F below the rmal. In Geneva frost persisted day and night throughout the month; in London no long riod of day and night frost occurred. In Feb. 1957 the mean temperature in London was .9°F (2°F above the normal); the Geneva temperature was almost 6°F above the normal and .6°F warmer than Feb. 1956. A mean monthly temperature of 42.9°F is exceeded one year in e in London; a value of 21.4°F has not been surpassed for more than 60 years in Geneva. ata are also given on differences as precipitation, sunshine and wind for the two stations during e successive Februaries of 1956 and 1957. The effect of the cold spell of Feb. 1956 upon Lake neva and on the Kentish coast is described. *Subject Headings:* **1. Synoptic studies 2. Continentality 3. Singularities 4. London, England 5. Geneva, Switzerland.**—*I.L.D.*

12L–116 551.509.31:551.515.83(439.1)

§Sugár, Margit, **Alcázott hidegfront átvonulása Magyarországon.** [Passage of a masked ld front through Hungary.] *Időjárás,* Budapest, 55(1/2):9–13, Jan./Feb. **1951.** 4 figs. **DLC** Synoptic development during the passage of a cold front through Hungary on Jan. 8, 1951 is scribed and illustrated by means of vertical cross sections, surface temperature curves and a ap showing advancement of the front. The passage of this front provided an example for the own fact that surface temperature may rise instead of fall during the passage of a cold front

over the continent in winter. Another peculiarity of this frontal passage was the lack of p cipitation which is attributed to the extreme dryness of the air masses involved. *Subject He ings:* **1. Synoptic studies 2. Frontal movement 3. Masked fronts 4. Hungary.**—*G.T.*

12L–117 551.509.31:551.51

Garriock, A. (*Central Met. Bureau, Melbourne*), **Cross section of Southern Ocean cyclo from observations at Kerguelen and Heard Islands.** *Australian Meteorological Magazi* Melbourne, No. 10:71–74, Sept. **1955.** 3 figs., table. **[Comments by]** R. H. Clarke in artic **Southern ocean analysis, Jan. 1–3, 1954,** and **[Reply by]** Garriock, in *Ibid.,* No. 11:85, 89, D **1955. DWB**—Simultaneous Kerguelen and Heard Island reports for the cyclone of Jan. 2, 19 were plotted so that the stations were positioned relative to each other and the plotting of repo at three hourly intervals were 135 miles apart on a line northwest/southeast, i.e., the cyclone w moving southeastward at 45 knots. The radiosonde and associated radiotheodolite winds at He Island show that a frontal zone was passed through by the sounding between 750 mb and 652 m where potential temperatures rose markedly and the wind backed with height. The hodograph these winds is said to be confirmatory evidence. A pilot balloon flight six hours later shows chaotic wind conditions in the lee of Big Ben. It appears to be practicable in certain situati to regard the sequence of observations taken at Kerguelen and Heard Islands as giving a cr section through a pressure system and particularly through a depression. CLARKE comments GARRIOCK'S article, with respect to short frontal segments compared with usual fronts thousa of miles long. He claims that the front which passed Kerguelen on Jan. 2, 1954 at 0300 co have been continuous with cold front at Amsterdam Island, and that the warm front of GARRI was a warm type occlusion, and the weak cold front at Amsterdam Island was actually a second cold front, continuous with GARRIOCK'S cold front at Kerguelen Island. GARRIOCK rep *Subject Headings:* **1. Cold fronts 2. Synoptic studies 3. Frontal analysis 4. Kergue Island 5. Heard Island.**—*E.Z.S. and M.R.*

12L–118 551.509.31:551.515.11

§Grace, Marshall F. and Bohl, Vernon G. (*both, Natl. Weather Analysis Center, U. S. W Wash., D. C.*), **Movement of an upper-air low over the western United States, October 24, 1957.** *Monthly Weather Review,* Wash., D. C., 85(10):350–356, Oct. **1957.** 7 figs., 8 r **DWB, DLC**—A case history study of an upper cold low which entered America near Vanco Island on Oct. 16, and taking a very erratic course, loused up the prognostic charts of NW and JNPU for a week. Comparison of projected centers, using SCHERHAG, WILSON, PETT SEN, BJERKNES and NWAC methods with observed, shows better agreement with Scherh steering method than with others, though for some of the period other methods were better 18–20th the movement was opposed to the steering current). Relation of jet maximum to m ment, etc. is discussed. *Subject Headings:* **1. Cold lows aloft movement 2. Scherhag's st ing current method 3. Synoptic studies 4. Western United States.**—*M.R.*

12L–119 551.509.31:551.5

§Norton, Lewis C. and Kulawiec, Matthem (*both, Natl. Weather Analysis Center, U. S. W Wash., D. C.*), **A storm over the Plateau, Jan. 20–21, 1957,** *Monthly Weather Review,* W D. C., 85(1):28–36, Jan. **1957.** 9 fig.s, 16 refs. **DWB**—A synoptic case history study North Pacific cyclone which stagnated near the mouth of the Columbia River on Jan. 20, accompanied by widespread rainfall south of the center and snow over the mountains and pl to the east, and cyclogenesis over the Columbia Basin. The track of the storm across Or Idaho, Wyoming and Colorado was considered normal for this type of storm. Cross sec upper level charts, are used to illustrate vertical development and changes. The storm precipitation and temperature changes, etc. are discussed in separate sections. *Subject Head* **1. Cyclonic storms 2. Synoptic case histories 3. Pacific Northwest United States—**

12L–120 551.509.31:551.511.1:551.515

Yamada, S., **A synoptic study on the mesoscale instability lines associated with s local storms.** *Journal of Meteorological Research,* Tokyo, 11(3):155–168, March **1959.** 34 4 refs. In Japanese; English summary p. 155. **DWB, DLC**—The author studied nine s local storms in Kyūshū district using synoptic scale analysis in various ways and mesoscale sis (radar analysis, three-hourly local map analysis and three-hour rainfall distribution anal and obtained the following results. All the local storms studied, etc., five heavy rains, waterspouts, and a strong thunderstorm were associated with the mesoscale instability lin each different type under the following synoptic conditions. (1) Convergence at 850 mb and divergence at 500 mb level. (2) Northwesterly cold advection at 700 mb or 500 mb and southwesterly warm advection at 850 mb or 700 mb level. (3) Approach of the warm short wave trough in the middle latitude to Kyūshū district. (4) Intersect of polar jet s

xis at upper or middle level and lower strong southerly jet stream axis with warm tongue. 5) Convergence and increase of mixing ratio at 850 mb and 700 mb level. (6) Intersect of varm tongue axis and wet tongue axis at lower level. *Subject Headings:* **1. Mesoscale instaility lines 2. Synoptic analysis 3. Severe storms 4. Kyūshū, Japan.**—*Author's summary.*

Synoptic Analysis—Miscellaneous (551.509.31)

See also: **Prediction of state of weather** (Mexico), 12L–481.

12L–121 551.509.31:551.511.1:551.515:551.577.37(522)

Yamada, S., **A synoptic study of the local heavy rains caused by the instability and meso-lows or micro-waves.** *Journal of Meteorological Research,* Tokyo, 11(7):567–580, July 1959. 46 figs., 4 refs. In Japanese; English summary p. 567. **DWB, DLC**—The author has analyzed 11 cases of severe local storms in 1957 and 8 cases of local heavy rains in 1958 in Kyūshū by making use of mesoscale and synoptic scale data, and has obtained the following results. (1) The severe weather is caused by the meso-scale instability lines and either micro-waves or meso-lows, the latter appearing about the intersection of upper cold front with surface warm or stationary front. (2) The meso-lows or micro-waves grow in the warm sector and ahead of the major-lows, when upper trough advances ahead of lower trough, or when the instability line coincides with the tip of warm tongue. (3) In consequence, severe weather accompanied with meso-lows or micro-waves breaks out under the middle layer cold front, near the point of occlusion, and about the tip of lower warm tongue axis. And then, these heavy rains break out where the vertical instability zone coincides with lower convergence. *Subject Headings:* **1. Synoptic analysis 2. Instability effects 3. Vertical instability 4. Heavy rainfall 5. Kyūshū, Japan.**—*Author's abstract.*

12L–122 551.509.31

Allied Forces. South West Area, **Notes on meteorological conditions over equatorial areas to the north of Australia, compiled by Allied Air Meteorological Service. [1942?]** 41 p. photostat. figs. **DWB**—A variety of notes with schematic sketches on tropical meteorology (for forecasters) in the New Guinea-N. Australia area. For instance the uncertainty of the location of the intertropical (convergence) front; the small or multiple frontal systems found near the borders of the convergence zone; (these are called subsidiary fronts); air masses in the Papua region; pressure and wind systems; the "Northwest" season (Apr.–Oct.); doldrum periods (Mar.-Apr. and Oct.–Dec.); tropical cyclones over Coral Sea (Dec.–March); map analysis and interpretation, visibility, etc. *Subject Headings:* **1. Equatorial analysis and forecasting 2. Tropical meteorology 3. New Guinea area 4. North Australia. I. Warren, H. N. II. Gibbs, W. III. McConnell, R. J. IV. Holmes, R. A. E. V. Grimes, A.**—*M.R.*

12L–123 551.509.31(99)

*Morita, Yasutaro and Kuga, Yushiro (*both, Japan Met. Agency. Antarctic Res. Exped.*) **Meteorological research during Antarctic summer, 1956/57.** *Antarctic Record,* Tokyo, No. 2: 43–50, Feb. 1958. 10 figs. (incl. photos), 8 tables. In Japanese; English summary p. 28–31. Also: . . . **1957/58.** *Ibid.,* No. 9:1–42, Jan. **1960.** 17 figs., 10 tables, charts p. 23–42. In Japanese; English summary p. 1–4. **DWB**—The results of the meteorological observations made by the Second Japanese Antarctic Expedition during their voyage to Syowa Base are presented. Summaries of weather experienced on board Soya are shown on a table. The synoptic analysis revealed that the area around Lützow-Holm was invaded by cyclones in the early summer and the anticyclonic ridge covering Enderby Land deviated from the circumpolar cyclones into Lützow-Holm Bay. The summarized weather situation is then presented for several stages of the operation, and is illustrated by figures and tables. The aerial operation in relation to the weather is evaluated; the drift of pack-ice by wind is analysed; finally the rate of recession of ice edge was calculated to be 1.2 km/day during the mid-summer period. The meteorological observations for every three hours from Dec. 11, 1957 to March 7, 1958 are presented in tables in the appendix. *Subject Headings:* **1. Synoptic analysis 2. Meteorological research 3. Antarctic.** —*O.T.*

12L–124 551.5(213)(023):551.509.31

†§U. S. Air Force, **Tropical meteorology.** May 1945. 233 p. numerous figs., charts, refs. Spanish translation, with title **Meteorologia tropical,** issuel by U. S. Air Force, Wash., D. C., Jan. **1950.** 268 p. diag., bibliog. **DWB**—A manual for forecasters operating in the trade wind belt. Intertropical zones, prepared by civil and military personnel at the Institute of Tropical Meteorology in Puerto Rico during the war. The general circulation in the tropics, dynamical meteorology as applied to the tropics, easterly waves, polar fronts' invading the tropics, the

Intertropical Convergence Zone, and tropical cyclones are treated in separate chapters, with m sample synoptic charts, cross sections, soundings, schematic diagrams and models. Many parts the tropics are covered, by examples (East Indies, Caribbean, West and East Central Afr Panama, etc.). *Subject Headings:* **1. Tropical meteorology manuals 2. Synoptic analy 3. Tropical cyclones 4. Forecast aids. I. U. S. Air Weather Service II. Chicago. Univ sity. Institute of Tropical Meteorology.**—*M.R.*

12L–125 551.509.31:551.326.83(282.24

Balashova, I. V., **Uchet glubiny reki pri kratkosrochnom prognoze vremeni poiavle l'da.** [Short range forecast of the date of ice appearance taking into consideration river dep *Moscow. Tsentral'nyi Institut Prognozov, Trudy,* No. 48(75):96–103, **1956.** 2 figs., table refs. **DLC**—The greater the water content of rivers the greater is the heat supply of the curr so that cooling takes a longer time, hence the accuracy of short range forecasting depends upo consideration of the water content of a given river. Forecasting the time of ice appearanc based upon the relationship of the sum of negative air temperatures necessary for the appeara of ice, $\Sigma\Theta a$, to the water temperature Θw at the beginning of transition to negative mean d air temperatures. The relationship, $\Sigma\Theta a$, to the initial water temperatures Θw was analy for mean depths on the day of ice appearance, the mean depth being the best criterion of varia of water content and of cooling conditions. The construction of computation graphs of relationship $(\Sigma\Theta a) = f(\Theta w \cdot h)$ is described and a graph showing the relationship of the sum negative air temperatures $(\Sigma\Theta a)$ necessary for the appearance of ice on the Volga at Kines to the initial winter temperature Θw and levels of water on the day of ice appearance (Hl presented. Data are presented showing that the probability of errors not exceeding two day not much greater than with graphs not taking water content into consideration but the distr tion of errors is improved because of the decrease in their number in cases where ice app during a high water amount. A generalized computational graph of the relationship of the of negative temperatures for the appearance of ice on the Kama River as a function of in water temperature and river depth is presented and analyzed. *Subject Headings:* **1. Short r ice appearance date forecasting 2. Freezing of rivers 3. River depth—water tempera —icing relationships. 4 Volga River, U.S.S.R. 5. Kama River, U.S.S.R.**—*I.L.D.*

Structure of Disturbances, Including Air Masses and Fronts on a Small Sca as Applied to Forecasting (551.509.311)

See also: **Synoptic application of dynamical concepts** (Sanders), 12L–207; **Trends of thought concerning meteorological research** (Starr), 12L–280.

12L–126 551.509.311:551.515.127:551.

Bailey, R. E. and Hilworth, J. T., **Movement of cold lows at the 500 millibar level, their influence on surface lows.** (In: Visscher, H. B. et al., **Development of practical, s range, weather prediction techniques.** Atlanta, Georgia, Eastern Air Lines, Dec. **1955.** p 79. 13 figs. **DWB** (M09.3 EL3d)—A method of predicting the movement of cold lows a 500 mb level is devised. Wave length and confluence parameters are used. The relation be the low at 500 mb and the capturing process of the surface low is examined and a metho predicting the surface low position is described. Emphasis is placed on capturing surface by 500 mb lows. Loopers are described. Graphs and maps illustrate the discussion. An tration of strong diffluence at 500 mb with its rapid capturing effect on the "Great Snow" c near New York City is included. *Subject Headings:* **1. Cold low movement 2. Loope Forecasting cold lows.**—*E.Z.S.*

12L–127 551.509.311:551.515:5

Bel'skaia, N. N. and Dmitrieva, G. V., **Proverka nekotorykh polozhenii ob izm dvaleniia u poverkhnosti zemli i peremeshchenii baricheskikh obrazovanii vydvinutyl I. Kashinym i M. V. Gritsenko.** [Verification of certain conditions for pressure variation the ground surface and the movement of baric formations introduced by K. I. Kashin a V. Gritsenko.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy,* No. 83:22–27, 1959 5 tables, 2 refs. **DWB**—Analysis of and comments on two articles published in *Meteoroi Gidrologiia,* Nos. 5 and 6, **1954** concerning: (1) increase of the atmospheric pressure unde ing sources and decrease of pressure under heating sources; (2) origin of the cyclone unde of heat; and (3) motion of the cyclones during day in the direction to the source or crest at the surface of 500 mb. These conditions are partially verified and are partially contra to conclusions given in the articles, as the authors comments indicate in reference to variations in the temperature and air movements affecting the partial discrepancies.

Headings: **1. Pressure variations near the ground 2. Cyclone formation 3. Cyclone trajectories.**—*N.P.S.*

12L–128 551.509.311

§Chu, K. C., **Methods of forecasting cyclogenesis over the East China Sea.** *Meteorological Bulletin,* Taipei, Formosa, 4(1):35–38, March 1958. figs., tables, 3 refs. In Chinese, English summary p. 35. **DLC**—In the spring season the upper flow off the east China coast exhibits a remarkable steadiness in direction. It is the prevailing west southwest upper current caused by the Himalyan Mt. obstruction. However, cyclogenesis over the sea of East China, Korea and Japan is found to be highly dependent on surface synoptic situations, especially when a break off of a portion of the Asia high moves towards Japan. A discussion is presented of day and night mean air temperature in a number of areas in Japan, Korea, and the Pacific islands in relation to formation of cyclogenesis and is presented according to four types: lineal direction, smooth-flow, circling at center, and air pressure at center. The method for forecasting cyclogenesis is given as three steps: (1) Upper flow pattern which is usually favorable for formation has to be taken into consideration; (2) Consider the surface synoptic pattern and note whether it has a trend towards breaking off a bubble high from the continental anticyclone; (3) Low level warming is another important criterion to be analyzed because the cold Asia continental high supplies continuously cold air to the newly formed cyclone. *Subject Headings:* **1. Cyclogenesis forecasting 2. East China Sea.**—*K.C. and author's abstract.*

12L–129 551.509.311:551.515.41

Gregor, Alois; Gregor, Zdeněk; Hrubeš, Pavel, et al., **Rozbor bouřek dne 13. a 14. Srpna 1957.** [Analysis of the thunderstorms of August 13 and 14, 1957.] *Meteorologické Zprávy,* Prague, 11(1):2–11, **1958.** 24 figs., 8 refs., 3 eqs. Czech, Russian and German summaries p. 2. **DWB**—On Aug. 13 and 14, 1957 violent thunderstorms occurred in Czechoslovakia accompanied by winds causing heavy damage. This paper contains a detailed synoptic analysis of the cases along with a description of the damage. A theoretical explanation is given of the origin of pressure drops which intensify the pressure gradient on the front side of thunderstorms, adding to the force of gusts. *Subject Headings:* **1. Thunderstorm formation 2. Synoptic analysis of thunderstorms 3. Pressure drops 4. Czechoslovakia. I. Vítek, Vojtěch.**—*Trans. of authors' abstract.*

12L–130 551.515.127:551.509.311

Il'inova, E. S., **Ob evoliutsii vysotnykh lozhbin.** [Evolution of upper level troughs.] *Sreadneaziatskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 1(16): 88–94, **1959.** 4 figs., table, 9 refs., eq. **DWB** (M(055) U581ts)—An attempt is made to obtain quantitative criteria for forecasting upper level troughs from a comparison of gradients within the anterior and rear parts. The development of upper level trough and ridges was investigated by examining the acceleration in the frontal zone. The development of upper level trough and ridges can be investigated by an examination of the acceleration in the frontal zone. The development of a trough was measured by the displacement of the isohypses on the axis in degrees of latitude; displacement to the south characterized deepening of a trough and to the north filling. The relationship of mean displacement of isohypses on the axis of isohypses and the difference of gradients in the rear and front parts showed a high correlation. Two types of troughs were established; simple ones with a simple axis and complex ones resulting from the interaction of several troughs. The simple types are divided into three subtypes depending upon the variation of the gradient along the stream lines. Type I—the gradient from front to rear has one sign: it either increases or diminishes; all air particles falling into the pressure field with a lesser gradient retard motion and deviate to the side of high pressure. Outflow of air proceeds in all parts of the trough which deepens. When the gradient along the stream line increases the particles accelerate, deviate to the side of low pressure and the trough fills up. Type II—on the axis the gradient is perceptibly less in comparison with the gradients in the anterior and rear parts. The trough is formed by a cyclonic upper level frontal zone of the second type; there is outflow of air in the rear and influx in the anterior part. Type III—on the axis the gradient is perceptibly greater than either in the anterior or posterior parts of the trough, which is a cyclonic upper level frontal zone of the first type. Troughs of type I are examined and rules employed in the Tashkent weather station to forecast successfully the evolution of troughs are examined. *Subject Headings:* **1. Upper level trough developments 2. Tashkent, Uzbek S.S.R.**—*I.L.D.*

12L–131 551.515.11:551.509.311(514)

Koo, Chen-chao and Liu, Jui-chih (*both, Inst. of Geophysics and Met., Academia Sinica*), **On the formation of the "North China Trough."** *Peking. Univ., Journal* (*Acta Scientiarum*

Naturalium Universitatis Pekinensis), No. 1:107–113, **1956.** 2 figs., 7 refs., 9 eqs. In Chines English summary p. 113. **DLC**—Over the plain of North China a shallow trough often appe when the northwesterly wind begins to blow aloft. It is suggested that this shallow trou results from orographic conditions. Using a simplified vorticity equation the authors compu numerically the surface barometric changes over the North China plain for the 24 hour interv The influence of North China topography was considered. A center of negative baromet changes of reasonable magnitude appears over the plain when the upper wind is northweste which may account for the formation of the shallow "North China Trough." *Subject Headin* **1. Trough formation 2. North China.**—*K.C. and authors' abstract.*

12L–132 551.509.311:551.515.11(

§*Lee, John, **Preliminary study on the application of polar front theory to the win cyclones along the lower Yangtze Valley.** *Academia Sinica. Institute of Meteorology, Mem* No. 2, April **1930.** 51 p. 15 figs., 2 tables, 9 refs. In Chinese and English. **DLC** (Orienta Chinese, F295.1 L97)—Air mass and frontal analysis is applied to the analysis of cyclones in Far East, for 1928–1929. *Subject Headings:* **1. Cyclone analysis 2. Frontal analysis Yangtze Valley, China.**—*H. Arakawa.*

12L–133 551.509.311:551.509

†Lee, R., **A synoptic approach to the problem of extended range forecasting.** *Can Meteorological Branch, CIR*-3181, TEC-299, April 9, **1959.** 11 p. 24 refs. **DWB**—The re not only discusses the means whereby long and short waves can be identified and their significa but also outlines their applications to extended range forecasting. The characteristics of fro cyclones and the contributions of cyclonic vorticity advection in the middle and upper troposp are considered. *Subject Heading:* **1. Long range forecasting.**—*N.N.*

12L–134 551.509.311:551.5

Orihata, J. (*Japan Air Lines, Tokyo*), **On the development of low latitude extra-trop cyclones in the East China Sea.** *Meteorological Society of Japan, Tokyo, Journal,* Se 34(4):202–211, Aug. **1956.** 10 figs., 5 tables, 7 refs. **DWB, DLC**—The deepening of cycl formed in the East China Sea during the year of 1954 is discussed in terms of the style of 500 mb contour patterns deduced from the Bjerknes' theory, with good results. In order to vide some concrete answers to salient contour patterns concerning the deepening of cyclones, of the cases studied are presented to illustrate surface and 500 mb synoptic situations each se *Subject Headings:* **1. Cyclone deepening 2. Cyclone forecasting 3. Extra-tropical cycl 4. East China Sea.**—*Author's abstract.*

12L–135 551.509.311:551.5

§Romanov, N. N., **Makrosinopticheskaia kharakteristika periodov s povyshennoĭ tsik cheskoĭ deiatel'nost'iu v Sredneĭ Azii.** [Macrosynoptic characteristics of increased cyc activity periods in Central Asia.] *Sredneaziatskiĭ Nauchno-Issledovatel'skiĭ Gidrometeore cheskiĭ Institut, Trudy,* No. 1(16):76–87, **1959.** 8 figs. **DWB** (M(055) U581ts)—The a investigated the macrosynoptic processes during which several cyclones successively irrupt Central Asia but differ little in their trajectories. Cyclones affectively influencing the weath individual regions of Central Asia are considered. Synoptic maps and pressure topography for Eurasia for the period 1942–1951 were used. The synoptic processes over the area of E covered by the meteorological network were described by means of synoptic maps of pla frontal zones aloft. The results of the analyses are as follows, viz.: (1) If northweste northerly cold air incursions occur over northeast and central Europe and if a stable fie negative isallohypses is observed simultaneously over the European territory of the U. then it is very probable that a series of several cyclones will develop within 4–5 days in C Asia. (2) The incursion of the first cyclone series in Central Asia is to be expected wh axis of the main planetary frontal zone aloft in the southern part of the trough over Eu U.S.S.R. reaches at least latitudes 45–47° during its orientation, (3) if an intense central c with a large number of closed isohypses is formed over European U.S.S.R. and the pr gradients in its area are greater than the gradients in the external frontal zone curving a it then no cyclone will erupt into Central Asia. When macrosynoptic conditions typic cyclonic incursions are maintained then a cyclone will irrupt 30–40 hours after an antic occluding the previous cyclonic incursions has either disintegrated or has reached 65–70°E or having moved eastwards its southwestern periphery comes to lie over Central Asia cyclone series is interrupted as a result of the following causes: (1) the southern part of t of the planetary frontal zone aloft recedes to the north and reaches 50°N lat., (2) the so part of the axis moves south and lies over the southern or southeastern regions of Centra

and (3) the series is concluded by a powerful Arctic incursion that is associated with the general rearrangement of intense fields of flow. *Subject Headings:* **1. Macrosynoptic conditions for cyclonic activity 2. Central Asia**—*I.L.D.*

12L–136 551.509.311:551.555.6:551.515.8(52)

§Saito, N., **On the analysis of cold wave in Jan. 1954 and the technique of forecasting of cold outbreak.** *Journal of Meteorological Research,* Tokyo, 8(6):343–353, July 1956. 11 figs., table, 10 refs. In Japanese; English summary p. 343. **[Comments by] R. Sasaki and S. Ito** and **[Reply by] Saito** in *Ibid.,* 9(2):153–155, March 1957. In Japanese. **DWB, DLC**—This synoptic study of weather development preceding and accompanying a cold-air outbreak over Japan includes 700 mb charts illustrating the general circulation in Jan. 1954, a qualitative formula for predicting the position of a long wave at the time of its deepening, and an analysis of blocking phenomena over the Pacific Ocean between Jan. 16 and 20. The **Comment** is a set of questions and answers in the discussion of Sasaki and Ito with Saito, involving the technique of forecasting the outbreak of the cold wave. An analysis of the cold wave of Jan. 1954 is presented. (*Same item as* 11.3–101, March 1960, *Met. Abs.*) *Subject Headings:* **1. Cold wave forecasting 2. Cold air outbreaks 3. Japan.**—*Author's abstract and E.Z.S.*

12L–137 551.509.311:551.515.1/2:551.577.37(498)

Stoica, Constantin, **Analiza condiţiilor metorologice care au determinat precipitaţiile din perioada 8–10 octombrie 1956 in bazinul inferior al Dunarii.** [Analysis of weather conditions responsible for the precipitation of Oct. 8–10, 1956 in the lower Danube basin.] *Meteorologia si Hidrologia,* Bucharest, 1(2)57–61, Dec. 1956. 6 figs., 2 tables. **DWB**—Heavy rainfall in Romania in October, 1956 (like the greater part of the rainfall of southeastern continental Europe) was associated with the passage of a cyclone from the Gulf of Genoa to the Black Sea region. The development of weather and circulation is described and illustrated by a chart showing the track of the depression, and 1000, 700 and 500 mb pressure charts. *Subject Headings:* **1. Weather analysis 2. Cyclonic rainfall 3. Heavy rainfall 4. Lower Danube Basin, Romania.**—*G.T.*

12L–138 551.509.311:551.515.1/2:550.342

Stolypina, N. V., and Monakhov, F. I., **Sinopticheskie usloviia vozbuzhdeniia mikroseĭsm v Chernom more.** [Synoptic conditions of the excitation of microseisms in the Black Sea.] *Meteorologiia i Gidrologiia,* Leningrad, No. 2:27–30, **1958.** 3 figs., 5 refs. **DWB, DLC**—The microseisms observed in the Crimea (recorded at the IAlta Microseism Station) in 1952 are analyzed in relation to the recurrence of cyclones and fronts; graphs are presented showing the mean monthly amplitude of microseism at IAlta and the number of days with fronts over the Black Sea per month in 1952, the number of days with microseisms with periods exceeding 5 seconds and the number of days with cyclones over the Atlantic Ocean per month in 1952, and the amplitude and periods of microseisms at IAlta and the synoptic situations over the Black Sea during Feb. 10–11, 1952. The relationship between cyclonic activity of the Atlantic Ocean and fronts over the Black Sea and microseisms is established. *Subject Headings:* **1. Synoptic conditions for microseisms 2. Black Sea.**—*I.L.D.*

12L–139 551.509.311

Tu, Hsing-yuan, **K voprosu o gidrodinamicheskoĭ teorii frontal'nogo tsiklogeneza.** [Hydrodynamic theory of frontal cyclogenesis.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 99:105–111, **1959.** 7 refs., 20 eqs. Russian summary p. 110. **DWB**—An approximate method of calculating the disruption of vertical velocity in a frontal surface for forecasting pressure change and cyclogenesis is developed by the author. Vorticity and heat inflow equations are used as initial parameters. It is shown that an increase (decrease) of temperature contrasts on the frontal surface contributes to the development of cyclogenesis (cyclolysis). *Subject Headings:* **1. Frontal cyclogenesis theories 2. Pressure change forecasting 3. Cyclogenesis forecasting.**—*A.M.P.*

12L–140 551.509.311:551.541:551.515.8

§Yamamoto, R. (*Mete. Res. Inst., Kyoto Univ.*), **A study of the microbarographic depression- and elevation-types, Pt. 1.** *Meteorological Society of Japan, Tokyo, Journal,* Ser. 2, 35(2):105–116, April **1957.** 23 figs., 2 tables, 10 refs. (For abstract on Pt. 2, *see* 11.6–301, June 1960, *Met. Abs.*) **DWB, DLC**—A study of the characteristics of the half-hour long V-shaped pressure dip of 0.5 to 7.0 mb or the MD-T, named and described by other investigators, and a rapid rise or a jump of the barometric traces associated with strong gusts and rapid fall of temperature in the surface layer along a squall line, called by the author a Microbarographic

Elevation—Type (ME-T). The author studied three MD-T (on May 30, 1953, April 25, 195 and on Jan. 18–19, 1956) with synoptic and isochronous chart of Shimonoseki in Kyushu Islan The shape of the barometric traces at each station was not always similar, but an appropria assumption is drawn from the various tables that all the MD-Types have the westerly compone in the propagation velocity travelling with the speeds of less than 40m/sec and do not exce 30m/sec. Its remarkable shape-change was transformed into ME-T, and MD-T seemed to be short lived disturbance. *Subject Headings:* **1. Microbarographic depression-type 2. Synop case history studies.**—*I. H. Woo.*

Kinematics Applied to Forecasting (551.509.312)

See also: **Numerical weather map analysis** (Haug), 12L–53.

12L–141 551.509.3

Bakhvalov, N. S., **Nekotorye zamechaniia k voprosu o chislennom integrirovanii diff entsial'nykh uravnenii metodom konechnykh raznosteĭ.** [Some remarks on the problem of t numerical integration of differential equations by finite difference methods.] *Akademiia Na SSSR, Doklady,* 104(6):805, **1955.** 3 refs., 13 eqs. Transl. into English by M. C. Whee issued as *Harwell, Eng. Atomic Energy Research Establishment, N.*27518 (HU), Aug. 19 6 p. 3 refs., eqs. Available. **DWB**—Solution includes an estimate of the error in numeri integration where in the neighborhood of the solution all values of $U - \lambda + hv - \lambda fy(x, y)$ non-negative. Examples are given. *Subject Headings:* **1. Differential equations 2. Foreca ing methods.**—*M.R.*

12L–142 551.509.312:551.513.2:523.746:551.509.

Baur, Franz, **Naphatások az időjárásra és a makroszinoptikai folyamatokra.** [Solar fluences on weather and large scale synoptic processes.] *Időjárás,* Budapest, 61(5):321–3 Sept./Oct. **1957.** 14 figs., 5 tables. English summary p. 321. German version p. 381–3 **[Comment by]** William van der Bijl in *Ibid.,* 62(3):169, May/June **1958,** and **[Reply by]** B *Ibid.,* 62(4):226–228, July/Aug. **1958.** Reply is in German, with Hungarian transl. p. 227– **DLC**—It is the aim of this paper to show that it is no longer reasonable to assume, as has l done in the past, that large scale weather and world weather are governed by an 11-year periodi corresponding to the sunspot cycle. New evidence is presented in support of the fact that l scale weather shows a double oscillation within the sunspot cycle. An attempt is made to gi physical explanation for this double oscillation. The significance of solar faculae for large s weather is demonstrated as well as the fact that a few days after intense chromospheric erupt (flares) mostly warm weather prevails in Central Europe. This and five other relations betw weather and solar events prove to be significant at a significance level of 0.0027. *Subject H ings:* **1. Sunspot cycle-large scale weather relationships 2. Sunspot cycles 3.Solar-wea relationships.**—*Author's abstract.*

12L–143 551.509.312:551.542.1:551.5

Bijvoet, H. C., **On the development of severe gales at the rear of depressions.** *B Freie Universität. Institut f. Meteorologie und Geophysik, Meteorologische Abhandlungen,* 9 27–31, **1960.** 3 figs., 5 refs., eqs. English summary p. 10. **DWB**—The study of weather and also theoretical investigations lead to the conclusion that pressure gradients rapidly inc on the rearside of depressions, when at a certain stage in the development of the low, the perature field shows in all layers a tongue of cold air with its thickness lines on the central parallel to the lines of equal geostrophic vorticity. It appears furthermore that the increa the pressure gradient at the surface also depends on the moisture content of the air. Isallo effects at the surface become very important if the air is dry since an irregular tendency must be expected under such conditions. *Subject Headings:* **1. Gale formation 2. Isallo effects 3. Pressure gradient variations.**—*Author's abstract.*

12L–144 551.509.312:551.513:52

*Cappel, A., **Die Häufigkeit der Grosswetterlagen im Sonnenfleckenzyklus.** [Freq of large scale weather situations within the sunspot cycle.] *Meteorologische Rundschau,* 10(6):189–196, Nov./Dec. 1957. 10 figs., 8 tables, 13 refs., eqs. Summary by Heinrich in *Naturwissenschaftliche Rundschau,* Stuttgart, 11(7):275, July **1958. DWB, DLC**—The large scale weather situations from the period 1881–1955 are classified into large scale w types and arranged according to their position in the sunspot cycle. The monthly deviations the secular mean value reduced to a cycle are presented in a table and several annual distrib are represented in graphs. The familiar double oscillation of the general atmospheric circ is evident in most large scale weather types in the monthly and annual deviations. Duri

transition months the double oscillation is most distinct in high pressure situations over western Europe where appearance appears to depend upon Baur's relative measure S of the solar radiation. The relationships between the frequencies of specific large scale weather types and solar processes is on the downward phase and is clearer at the time of sunspot minimum then during intensified sunspot activity. It is shown that the sunspot extremes ought not to be regarded as equivalent in the case of circulation analyses. The persistence tendency of easterly situations seems to be greater during large sunspot minimum. The sum of absolute amounts of deviations of all large scale weather types within the individual phases shows a simple oscillation in the sunspot cycle. Extensive statistical data on the frequencies of the large scale weather types and their deviations in the sunspot cycle in days per month are presented. *Subject Headings:* **1. Sunspot cycle—large scale weather relationships 2. Sunspot cycles 3. Large scale circulation 4. Solar-weather relationships.**—*Based on author's abstract.*

12L–145 551.509.312:551.515.2

Carson, Robe B. (*Weather Bureau Airport Station, Miami, Fla.*), **Observations on the utility, the limitations, and the didactic value of synoptic streamline analysis.** *New York Academy of Sciences, Transactions,* Ser. 2, 20(7):657–677, May 1958. 8 figs., 19 refs. **DLC**—Originally issued under title **The asymptote as a synoptic tool.** (see 8C-8, March 1957, *Met. Abs.*) *Subject Headings:* **1. Isotach analysis 2. Tropical cyclone forecasting 3. Asymptote analysis.**

12L–146 551.509.312:551.547:551.557

§Cole, Allen E., **Refinements in utilization of contour charts for climatically specified wind profiles.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics,* No. 116, Oct. 1959. 18 p. 8 tables, 3 refs. **DLC, DWB**—Differences between mean monthly (or seasonal) wind profiles obtained from actual wind observations and those prepared from height contours of constant-pressure charts are examined. The study is divided into (a) a comparison of mean monthly vector winds based on complete sets of monthly rawin observations with geostrophic and gradient winds taken from mean monthly constant-pressure maps and (b) an investigation of the accuracy of mean monthly resultant winds computed from complete sets of rawin data. Procedures for preparing mean monthly and seasonal wind profiles from data obtained from the height contours on mean monthly constant-pressure maps are recommended. *Subject Headings:* **1. Wind profile analysis 2. Upper air wind 3. Constant pressure charts.**—*Author's abstract.*

12L–147 551.509.312:681.1

Computer simulates any weather conditions. *Science News Letter,* 68(3):45, July 16, 1955. **DWB**—The so-called "house analog" developed by Minneapolis-Honeywell Regulator Company is a 5-foot electronic brain designed to compute pre-determined information about any type, size and location of a house any type of weather conditions. One second of the "house-analog's" time is equal to 60 days actual time of a house—or weather. *Subject Headings:* **1. Numerical forecasting 2. Analog computers.**—*W.N.*

12L–148 551.509.312

de Jong, H. M. (*Royal Netherlands Met. Inst., De Bilt, Holland*), **On the properties of composite charts in meteorology.** (In: Angola. Serviço Meteorológico, **Miscelanea geofísica.** Luanda, 1956. p. 114–121. 3 figs. **DWB** (M(08) A592mi)—This paper is dealing with some problems which are raised in connection with the use of composite charts. By means of a simple mathematical analysis it is shown that in composite charts of constant pressure surface topographies the relation between the wind field and the field of contours according to the geostrophic wind equation is lost, unless the construction method of these charts had been specially arranged. *Subject Headings:* **1. Composite charts 2. Constant pressure surfaces 3. Wind fields.**—*Author's abstract.*

12L–149 551.509.312

Dubov, A. S.; Zaĭtseva, T. G. and Rakova, Z. S., **Sravintel'nyi analiz nekotorykh prosteishikh metodov chislennogo prognoza.** [Comparative analysis of some of the simplest methods of numerical forecasting.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 81:46–52, 1959. 2 figs., 2 tables, 8 refs. **DLC**—The graphic analytical methods of Fjørtoft and of Buleev-Uspenskiĭ, utilizing a barotropic model for forecasting AT_{500} and the method of Iudin utilizing a baroclinic model for forecasting AT_{500} are compared. The three methods are described briefly. The comparison is based upon 20 daily forecasts during Oct 1956 for an area extending over northwestern Europe and European U.S.S.R. The success of the forecast was evaluated by the following criteria, viz: (1) validity of the forecast-ratio of number of points in which

the calculated and actual variations did not exceed 4 dkm to the total number of points of th network; (2) relative error, i.e. ratio of mean modular error of the forecast to the mean modula actual variability for the given 24 hours; and (3) mean error of the forecast. All three method gave a similar verification but with respect to relative errors the method of Buleev-Uspenskiĭ wa poorer so that Fjørtoft's method is superior for forecasts with a barotropic model. The use o the "inverse relationship" in the method of Buleev-Uspenskiĭ was not an adequate approximatio to the accurate solution of the problem of the relationship between daily variation of vorticit velocity and geopotential at a given point. The method using the baroclinicity of the atmosphe did not give better effectiveness. Various methods for forecasting the displacement of pressur methods, namely the inertia method, method of steering current, method of Bushuk and the form extropolation of Pettersen-Ganden are compared. The hydrodynamic method of forecasting pre sure centers is as effective as the synoptic methods and in some instances it is even superio With regard to angle errors, averaged for all cases, the method of Pettersen-Ganden gave th best results. The method of Bushuk gave the best results for low and medium cyclones and als for filling cyclones. For high altitude cyclones the inertia method gave the lowest errors. *Su ject Headings:* **1. Numerical forecasting methods 2. Pressure center forecasting 3. Nort western Europe 4. European U.S.S.R.**—*J.L.D.*

12L–150 551.509.312:517

Hess, Seymour L. (*Dept. of Met., Florida State Univ., Tallahassee*), **Simple forms of t geostrophic and thermal-wind formulae for rapid calculations.** *American Meteorologi Society, Bulletin,* 39(4):228–229, April **1958.** 7 eqs. **[Comments by]** Chester L. Glenn, *Ibi* 40(3):151, March **1959. DWB, DLC**—Applications of a simplified numerical procedure demonstrated to facilitate considerably the calculations in differential analysis. *Subject Heading* **1. Differential analysis 2. Numerical forecasting 3. Geostrophic equations.**—*Autho abstract.*

12L–151 551.509.312:551.515.23:681.14:62

Ito, H.; Masuca, Y. and Terauchi, E. (*all, Met. Res. Inst. & Japanese Met. Agn., Toky* **On the routine forecast of typhoon movement by the numerical prediction method.** (I Technical Conference on Hurricanes, Miami Beach, Fla., Nov. 19–22, 1958, **Proceedings,** issu **1958** (?) Section E5 (3 p.) table, 3 refs.) **DWB** (M15.2 A512pr)—Test results of barotro prediction by an IBM 650 computer were almost satisfactory and indicate the suitability of 700 mb and the 500 mb level charts in the easterly and the westerly zones respectively. *Sub Headings:* **1. Typhoon track forecasts 2. Numerical typhoon movement forecasting Barotropic forecasts.**—*W.N.*

12L–152 551.509.

Koo, Chen-Chao (*Inst. Geophys. Met., Academia Sinica, Peking*), **On the equivalency formulations of weather forecasting as an initial value problem and as an "evoluti problem.** (In: Bolin, Bert (*ed.*), **The atmosphere and the sea in motion.** N. Y., Rockefe Institute Press, **1959.** p. 505–509. 4 figs., 8 refs., 7 eqs.) **DLC.** Also in *Acta Meteorolo Sinica,* Peking, 29(2):93–98, May **1958. DWB**—Weather forecasting is formulated as an in value problem in the work of numerical forecasting, while in routine forecasting in the con tional way it is formulated as an "evolution" problem of the weather processes, especially sidering one specific level. It is shown in this paper that these two different formulation fact are equivalent for large-scale motions under certain trivial conditions. It is also poi out that for large-scale motions the three-dimensional structure of the baroclinic atmosphere certain moment is implicitly determined by and could be reconstructed from the evolution of contour and temperature fields at a certain level before and after that moment. (For same au in Chinese, *see* 10.4–124, April 1959, *Met. Abs.*) *Subject Heading:* **1. Forecasting techni** —*Author's abstract.*

12L–153 551.509.312:551.

Liao, S. I., **Basic theory of Fjørtoft method and some discussions.** *Meteorological letin,* Taipei, Formosa, 1(4):16–28, Dec. **1955.** fig., 11 refs., 133 eqs. In Chinese. (Orientalia)—This paper is concerned with three problems: introducing a basic principle of lute vorticity; reviewing a constant law of relative vorticity used in chart forecasting metho Y. C. Hsu (*Met. Bulletin,* Taipei, Formosa, 1(1):36–38, **1955**); and adding a few points t method of chart forecasting. The theories on numerical prediction of large scale, num integration of barotropic vorticity equation, Fjørtoft's chart analysis, wave motion in westerlies, geostrophic deviation and approximation, quasi-horizontal and hydrostatic appro tion in the general atmosphere and computational stability are introduced in discussions so

point out the merit and demerit in theory and practice. *Subject Headings:* **1. Weather forecasting 2. Numerical analysis 3. Vorticity.**—*K.C.*

12L–154 551.509.312:061.3

Mashkovich, S. A., **Vsesoiuznoe soveshchanie po teorii izmeneniia davleniia i protsessov tsiklo- i antitsiklo-geneza.** [All-Union Conference on the theory of Pressure Change and the Processes of Cyclogenesis and anticyclogenesis.] *Meteorologiia i Gidrologiia, Leningrad,* No. 3: 63–64, March **1959. DWB, DLC**—This conference was held in Moscow in Dec. 1958 at the initiative of the Central Institute of Forecasting. Most of the 30 papers presented, dealt with hydrodynamic forecasting methods including the use of electronic computers. The papers dealt with the following problems, viz: forecasting of pressure in the mean troposphere with the aid of the barotropic model; forecasting pressure fields at different levels; effect of absence of observational and data of artificial limiting conditions upon the quality of forecasts; consideration of non-geostrophic wind in forecasts; forecast of evolution of baric formations and local pressure variations with consideration of wind data; forecast of pressure field by different graphic methods; forecast of pressure field for different atmospheric conditions with empiric influence functions, etc. More exact methods of solving the Poisson equation and expanding the forecast region within the barotropic model were developed. Numerical forecasting of rapid movement of pressure structures over large distances by using baroclinic models were presented. Further development of numerical forecasting methods is not possible without high speed computers. Further study must be made by synoptic methods of the development of cyclones under specific geographic conditions. *Subject Headings:* **1. Hydrodynamic forecasting methods 2. Poisson equation 3. Numerical forecasting methods 4. Meteorological conferences 5. Electronic computers 6. Moscow U.S.S.R.**—*I.L.D.*

12L–155 551.509.312:551.511.32

*Mashkovich, S. A., **Uproshchennyĭ sposob integrirovaniia uravneniia vikhria v prognosticheskikh tseliakh.** [Simplified method of integrating vorticity equations for forecasting purposes.] *Moscow Tsentral'nyĭ Institut Prognozov, Trudy,* No. 86:42–48, **1959.** 4 tables, 7 refs., 14 eqs. **DWB**—The majority of contemporary studies of the short range forecasting of pressure by the hydrodynamic method lead to the solution of linear non-uniform differential equation related to the derivative of pressure on time (or geopotential). In the solution of simple cases for barotropic shape of the atmosphere, the Poisson and Helmholtz equations are used with the Green function, which are very complicated. The author suggests the approximate solution of the forecasting equation and applies it to examples of the barotropic atmosphere, represented by the forecasting equation for the vertical component of the vortical velocity written in spherical coordinates. This mathematical process is described with the differential equation and with evaluation of the errors due to the use of the method of approximation. *Subject Headings:* **1. Short range forecasting 2. Pressure forecasting.**—*N.P.S.*

12L–156 551.509.312:551.511

Mihaljan, John M. (*Univ. of Chicago*), **A study of the finite difference solution of the forced wave equation.** Chicago. Univ. Dept. of Meteorology, Contract Cwb-9270, Technical Report, No. 2, Sept. **1958.** 29 p. 14 figs., 2 tables, 3 refs., 41 eqs. **DWB** (M15.2 C532tec)—Four schemes for numerically integrating the forced wave equation, or its equivalent form as two first-order equations, are examined theoretically. It is found that only the centered schemes do not lead to damping of the motion. It is shown that the finite-difference equations lead to a system of resonances which the continuous solutions do not possess. Three rather extensive hand computations are discussed and the results compared with the exact known solutions. It is found that if the forcing term in the wave equation is monotone in space and time and is nonzero only within a band of width l, then for acceptable truncation errors, the distance over which first derivatives are approximated, must be less than $l/5$. *Subject Heading:* **1. Forced wave equations.**—*Author's abstract.*

12L–157 551.509.312:551.515

Miles, M. K., **Factors leading to the meridional extension of thermal troughs and some forecasting criteria derived from them.** *Meteorological Magazine,* London, 88(1045):193–203, July **1959.** 11 figs., 2 tables, 2 refs. **DWB, DLC**—An extensively illustrated report of a systematic and detailed study of a large sample of meridional extensions. The observational material include all thermal troughs which underwent m.e. between longitudes 20°W and 20°E during the four years 1953–56. There were 102 such cases and about three-quarters of them underwent a further extension in the following twenty-four hours (42 of them a further 5° latitude or more). In the light of these observations the mechanism of the meridional extension process is described

and the associated factors are discussed. Later, forecasting criteria of occurrence and locatio of meridional extensions are proposed. The paper also reports a forecasting test carried out o the data for 1957. A list of 8 conclusions drawn from the study concludes the paper. *Subje Headings:* **1. Forecasting methods 2. Meridional extension.**—*I.S.*

12L–158 551.509.312:551.513.

Monin, A. S., **O predvychislenii kharakteristik zonal 'noi tsirkuliatsii atmosfery.** [Precalcul tion of the characteristics of zonal atmospheric circulation.] *Akademiia Nauk SSSR, Izvestiia, Se Geofiz.*, No. 10:1250–1253, Oct. **1958.** 2 refs., 11 eqs. **DLC.** Transl. into English in correspondin issue of its *Bulletin of the Academy of Sciences of the USSR, Geophysics Ser.* **DWB**—For long rang forecasting of large scale components such as the zonal circulation, a closed system of equations set up. The zonal circulation is considered as an ideal incompressible two dimensional spherical film The idealized dynamic equations are written as

$$\frac{\partial u}{\partial t} + \frac{V}{R}\frac{\partial u}{\partial \theta} + \frac{u}{R\sin\theta}\frac{\partial u}{\partial \lambda} + \frac{uV\,ctg\theta}{R} = -\frac{1}{R\sin\theta}\frac{\partial p}{\partial \lambda} - 2\omega V\cos\theta,$$

$$\frac{\partial V}{\partial t} + \frac{V}{R}\frac{\partial V}{\partial \theta} + \frac{u}{R\sin\theta}\frac{\partial V}{\partial \lambda} - \frac{u^2 ctg\theta}{R} = -\frac{1}{R}\frac{\partial P}{\partial \theta} + 2\omega u\cos\theta, \qquad \frac{\partial V\sin\theta}{\partial \theta} + \frac{\partial u}{\partial \lambda} = 0$$

In these equations t = time; θ, λ = geographical coordinates; u, V = velocity components alo latitude and longitude respectively; P = potential energy; R = radius of the earch; and ω = angul velocity of earth's rotation. The condition of the atmosphere is described by the functions u, and P. The deviation of a closed system of equations from these equations by a process of succe sive approximation is illustrated. This sytem is

$$\frac{\partial \alpha}{\partial t} = -\frac{1}{R^2\sin^3\theta}\frac{\partial \overline{u'V'}\sin^2\theta}{\partial \theta}$$

$$\frac{\partial \overline{u'V'}}{\partial t} = -E\sin\theta\frac{\partial \alpha}{\partial \theta}, \qquad \frac{\partial E}{\partial t} = -\overline{u'V'}\sin\theta\frac{\partial \alpha}{\partial \theta}$$

The solution of these equations is discussed. *Subject Headings:* **1. Long range forecasting. Zonal circulation.**—*I.L.D.*

12L–159 551.509.312:551.509.329:551.

Nemchinov, S. V., **Kratkosrochnyĭ prognoz polia atmosfernogo davleniia dlia trekhsloi model atmosfery.** [Short range forecast of the atmospheric pressure field for a three laye model of the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 3:432–444, Ma 1959. 8 figs., 3 tables, 4 refs., 3 eqs. **DLC.** Transl. into English in the corresponding is of its *Bulletin of the Academy of Sciences of the USSR, Geophysics Ser.* **DWB**—A model the atmosphere consisting of the three levels 250, 500 and 750 mb is used to forecast the pres field 1–2 days in advance by solving the linearized system of the equations of hydrothermodynam In setting up the initial closed systems of differential equations conditions of extreme vert velocities at the 500 mb surface are used. An analytical solution is presented, and it is the b for the development of a method of forecasting maps of absolute topography of isobaric surfa Examples of forecasts are presented. *Subject Headings:* **1. Short range forecasting 2. Atm pheric pressure field 3. Atmospheric models.**—*Transl. of author's abstract.*

12L–160 551.509.312:551.50

Niigata District, Japan. Meteorological Observatory, **On a numerical method of the 7- forecasting.** *Journal of Meteorological Research*, Tokyo, 9(4):277–278, June **1957.** fig., In Japanese. **DWB, DLC**—For the purpose of checking the development and position of tro and summit in the weather variation more precisely the variation of current in the nort hemisphere, the author used three day mean charts at 700 mb of Dec. 7–9, 1955. The contin of vorticity can be measured neither from the trough position nor from the flexibility of vorti unless the vorticity equation is calculated. Here the equation was applied according to the Sew Mathewman Rule (distance 55 km, each 5 or 10° of latitude.) If the value of the variatio known in the vorticity equation, the presumed value of jet and trough position can be meas from the three day mean charts. *Subject Headings:* **1. 7-day forecasting 2. Numerical casting.**—*K.C.*

12L–161 551.509.312:551.5

Orihata, J. (*Japan Air Lines, Tokyo*), **Cyclogenesis in the field of hyperbolic pre pattern over Japan Area.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 34(2)

94, May **1956.** 11 figs., 5 tables, 5 refs., eq. **DWB, DLC**—A synoptic example (Dec. 2–3, 1953) is presented here in the vicinity of Japan in terms of the analysis based on the theory of isentropic upgliding motion described by J. Bjerknes. It is clearly seen that the upgliding motion on the warm side and the downgliding motion on the cold side of the cold front advectively generated by the Siberian High, progressively develops, leading to the intensification of the front. It is also revealed how the incipient frontal wave has been characterized by the inception that the eastern portion of the cold front has changed into the warm one. *Subject Headings:* **1. Cyclogenesis 2. Isentropic analysis 3. Hyperbolic pressure pattern.**—*Author's abstract.*

12L–162 551.509.312:517.6:681.14

Page Communications Engineers, Inc., **Proposal for system integration, test and operational implementation, Weather Observing and Forecasting System 433L.** Submitted by Page Communications Engineers, Inc., a subsidiary of Northrop Corporation, and supporting industry team, Booz-Allen Applied Research, Inc., et al. **Vol. 1, Management and Technical proposal.** (1959). 22 p. 11 figs. **DWB** (M09.3 P132pr)—The present manual is Volume I of the proposed system consisting of two sections. In the first section the management techniques, he discusses and illustrates the organization and structure of the proposed system. The establishment of a central project office, an interim data processing center, a test facility on the east coast of the U. S. and data processing center are the chief organizational features. The "433L Program" will fall into three periods: Interim computer program; testing and evaluation and establishment of a test facility; and data processing center and the future system. The second section reviews the major technical problems and suggests an approach to solve them. The first task of the six-year integration program is the establishment and operation of the System Integration Test Facility. The CPO Engineering Department will centrally direct its design, establishment, maintenance and operation through six divisions: forecast and analysis division, observing subsystem, data handling subsystem, data processing subsystem, display and presentation system and human engineering division. *Subject Heading:* **1. Forecasting system 433L.**—*I.S.*

12L–163 551.509.312

§Petrosiants, M. A. and Chernysheva, O. N., **Termobaricheskie polia intensivnykh oblastei izmeneniia davleniia.** [Thermobaric fields of intensive areas of pressure changes.] *Sredneaziatskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 1(16):32–75, **1959.** 2 figs., 12 tables, 20 refs., 19 eqs. **DWB** (M(055) U581ts)—The author investigated the characteristics of the thermobaric fields during intense rise or fall in pressure at the surface of the earth in order to determine those properties of the structure of fields that are associated with intense variations of pressure at the surface of the earth. The criterion of pressure change at the surface of the earth was taken as ± 5 mb/3 hours or more. The thermobaric fields corresponding to this intense pressure change, were characterized quantitatively by determining the magnitudes of the first, second and third order of the geopotential of isobaric surfaces and temperatures of these surfaces, and also the relative topography layer between 500 and 1000 mb. The derivatives were computed by finite differences. The magnitude of the derivative was taken as the first finite difference beginning with which it does not change when the interval of the independent variable decreases. The dimensions of isobaric rgions, the distances between them and the dimensions of the thermobaric fields during synoptic processes tending to intense pressure variations were within 250–2500 km. The procedure applied to synoptic maps of the Tashkent Weather Bureau and the equations for calculating the derivatives are presented. Data giving the mean magnitudes and standards of finite geopotential differences of isobaric surfaces for different intervals along the horizontal mean absolute values of finite differences of the geopotential of isobaric surfaces for different intervals along the horizontal, mean values and standards for the variation of vertical vorticity terms along the tangent $\Delta Qg/\Delta s$ the normal $\Delta Qg/\Delta n$ advection of wind A_Ω and advection of deviation of the vortex from the geostrophic A_Ω (interval 500 km), mean magnitudes and standards of finite differences of temperature on isobaric surfaces during different intervals along the horizontal coordinate system etc. are presented in tables. In general first differences of the geopotential indicate that the centers of isallobaric regions do not possess any specific characteristics in comparison with other points of frontal zones. The values of the second order differences differ among themselves although their variability is generally similar; the differences of the mean values exceed 0.60 so that the values are not random. The third differences as a whole show that with decrease in interval both the mean values and mean standards increase; the diminuation of the interval by times involves a 5 to 10 fold increase of the standards and 2–5 fold increase of the means. Further analysis is concerned with the calculation of the variation of the curves of isohypses along currents and normal to them, verification of the reliability of the order of magnitude $\Delta^3 H_1/\Delta^2\partial \cdot \Delta n_\partial$; characterization of the temperature field in regions of rise and fall of pressure etc. *Subject Headings:* **1. Thermobaric fields 2. Pressure variations.**—*I.L.D.*

12L–164 551.509.312:551.557.2:551.54

Ruzin, M. I., **K analizu atmosfernykh dvizheniĭ po poliu davleniia.** [Analysis of atmospheric movements from the pressure field.] *Akademiia Nauk SSSR, Izvestiia, Ser Geofiz.*, No 12:1895–1901, Dec. 1959. 2 figs., 9 refs., 11 eqs. **DWB, DLC**—Consideration of ageostrophic deviations and acceleration of the atmosphere in most cases, renders more accurate computation of trajectories of air particles. This is particularly essential in computing "long trajectories" expressing the movements of atmospheric-particles over several days. In most cases the ordinary trajectory is closer to the actual than the geostrophic trajectory. This is apparently associated with a given consideration during the construction of the first curvature of the isotypes. The effect of vertical turbulent exchange on the movements of air in the free atmosphere in a frontal region can be considerable if the air moves for a sufficiently long time in the immediate vicinity of the frontal surface. In the presence of considerable horizontal gradients of wind velocity, a substantial effect of lateral friction may manifest itself. From these conclusions it follows, that analysis of atmospheric processes by constructing the trajectories of atmospheric particles can be expanded and made more accurate. Formulas for trajectories taking into account lateral friction are developed. The comparisons of such trajectories with aerostats for cases of marked lateral friction would allow the determination of coefficients of horizontal turbulent exchange independently of other methods. Equation of computing trajectories of air particles in the presence of surface discontinuities is derived and the comparison with actual trajectories of air particles presented. *Subject Headings:* **1. Air particle trajectories 2. Vertical turbulent exchange 3. Horizontal turbulent exchange.**—*I.L.D.*

12L–165 551.509.31

Sangster, Wayne E. (*Weather Forecasting Research Center*), **A modified "Sigma" system of coordinates.** Chicago. Univ. Dept. of Meteorology, Contract AF 19(604)-7230, Scientific Report No. 1, Sept. **1960.** 70 p. 7 figs., 12 refs., 75 eqs. **DWP**—A coordinate system is presented in which the lowest coordinate surface represents the topography of the earth's surface. Higher coordinate surfaces reflect this topography in diminishing degrees and become isobaric at and above the 500-mb level. Some basic equations of dynamic meteorology are derived in terms of this coordinate system. A numerical prediction scheme using the primitive equations of motion and this coordinate system is outlined. A method of representing the field of the horizontal pressure force in the nonisobaric coordinate surfaces, using geostrophic stream and potential functions, is described. This method is applied to a variety of synoptic situations, and the results are compared with the conventional sea-level charts. The charts of the geostrophic stream and potential functions appear to given a more accurate representation of the geostrophic wind field than do the sea-level charts. It is shown that an appreciable diurnal variation of the geostrophic wind at the ground occurs over the Great Plains if the diurnal temperature variation is large. Evidence is presented to show that adiabatic heating due to down-slope motion may be a contributing factor to cyclogenesis in the lee of the Continental Divide. *Subject Headings:* **Numerical forecasting 2. Synoptic situations 3. Forecasting techniques.**—*Author's abstract.*

12L–166 551.509.312:551.515

Sasaki, Y. (*Geophy. Inst., Tokyo Univ.*), **On the motion of a vortex.** *Meteorological Society of Japan, Tokyo, Journal,* Ser. 2, 35(3):151–159, June **1957.** fig., 16 refs., numerous eqs. **DWB, DLC**—In the previous paper, the author introduced into meteorology Hamilton's canonical equations based on the variational principle. Using these canonical equations, we obtain an exact solution in a special case where the vortex is initially in the uniform flow, and we get the same result as Syono's, that the meandering motion of vortex is due to the change of basic flow, and that the ageostrophic wind acts effectively on the change of basic flow in low latitudes. *Subject Headings:* **1. Vortex movement 2. Numerical forecasting.**—*Author's abstract.*

12L–167 551.509.3

Szepesi, Dezső, **A divergenciamentes szintről.** [The level of nondivergence.] *Időjárás*, Budapest, 64(1):54–55, Jan./Feb. **1960.** 2 figs, 6 refs., 3 eqs. **DLC**—An analysis of the level of nondivergence is presented. The development of the hypothesis of nondivergence by Bjerknes, J. Holmboe and J. Charney is surveyed. A model of the vertical distribution of divergence is illustrated digrammatically. The location of the level of nondivergence is determined by a series of equations. The results of H. Landers' investigation on the actual distribution of divergence are shown by a diagram. The following statements are explained on the accomplishment of the conditions of nondivergence: 1) A level of nondivergence does not exist in the atmosphere; 2) The existence of a stratum of nondivergence and its characteristics; 3) The level of minimal divergency at about 600 mb. *Subject Headings:* **1. Level of nondivergence analysis 2. Divergence distribution.**—*O.T.*

12L–168 526.812:551.509.312

Tänczer, Tibor,and Tóth, Pál, **A J(φ) függvény kiszámítása Lambert szögtartó kúpvetületének közelítő leképezésével.** [Computation of the function J(φ) by approximate projection of Lambert's conformal conical projection.] *Időjárás,* Budapest, 63(4):243–246, July/Aug. **1959.** 3 figs., table, 2 refs., 9 eqs. **DLC**—Reviewing Fjørtoft's graphic method which is adequate to reach exact prognosis by relatively simple means in a short time, an endeavor is made to solve difficulties in the computation of the average geopotential field, which are due to certain map projections. In the case of Lambert's conformal conical projection universally used in meteorology, a more simple but fairly approximate expression was sought. The distortion formula, and the numerical integration were applied to check the results. For the graphical presentation the Lambert-projection was substituted by the more simple De l'Isle projection still applicable because of only negligibly small distortion of conformity. The results were shown on a table expressed in potential meters for each tenth degree of latitude, and they were also applied in the same units on the map of the Lambert projection. *Subject Headings:* **1. Lambert's conformal conical projection 2. Forecasting methods.**—*O.T.*

12L–169 551.509.312

§U. S. Navy, **Height change charts 500 millibar.** Prepared by the Bureau of Aeronautics Project AROWA (TED-UNL-MA-501). First issue received, Jan. **1949.** Last issue received, June 1, 1952. unpaged. 17 cm × 11cm 1 p. text, charts. **DWB**—Charts present daily height changes for a 5° diamond grid, based on the Historical Weather Map series, showing also isallobars for each 200 ft and the estimated maximum change in the isallobaric center. The charts cover the Northern Hemisphere completely up to 25°N and only up to 10°N for the Atlantic and Western Pacific section. *Subject Headings:* **1. Isallobaric charts 2. Historical weather maps 3. Northern Hemisphere.**—*A. Assur.*

12L–170 551.509.312:551.511:551.543.5

*Vetlov, I. P., **Analiz lokal'nykh izmeneniĭ absoliutnogo geopotentsiala i prizemnogo davleniia.** [Analysis of local changes in the absolute geopotential and near the ground pressure.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 70:13–54, **1958.** fig., 15 tables, 14 refs., 67 eqs. **DWB, DLC**—Various problems on weather forecasting are based on the forecasting of the baric field, and therefore study of atmospheric pressure changes or the heights of absolute topography is important. New approaches on these aspects (made by A. M. Obukhov, N. I. Buleev, I. A. Kibel and others are listed in 14 references) are briefly discussed in the introduction. Many factors, affecting the changes in the baric field are indicated by these authors. These factors are expanded in the concepts of dynamics of atmospheric processes and they are defined by new approaches in the preparation of quantitative forecasts of the pressure field and in the use of qualitative methods for forecasting of atmospheric processes. However, some solutions are not accurate due to over simplification. For example: (a) in the turbulent velocity equation, only the main members are considered (such as advection of turbulent velocity and divergency of velocity of the horizontal stream); (b) in the obtained equations, the vertical temperature gradient is considered independent from the space coordinates and time. The Poisson equation is used with excessive simplification and the effect of the turbulent viscosity is not considered as well, as the radiational and turbulent heat inflows and some other factors. In the author's analysis the given factors indicate the quality of the diagnosis and prognosis of separate simplifications adopted in the developed formulas. Moreover, the values of thermal and non-thermal factors are given for local pressure changes at different atmospheric levels and also there is shown the relation of the vertical velocities and pressure changes near the ground from the stratification of atmosphere and local latitude. The author also deals with the following topics giving formulas: 1) Differential equations for vertical component of the turbulent velocity, are developed without considering frictional forces and are simplified for the determination of derivative of geopotential on time ($\partial H/\partial t$). Quantitative computation is made for (H_{500}) by various methods and the results are tabulated for comparison; 2) The role of thermic and non-thermic factors in the local changes of the geopotential of different isobaric surfaces are expressed with the differential equations and the tabulated data; 3) A simplified method of forecasting local change in the geopotential (H_{500}) is described,with consideration of local latitude and the effect of the earth's rotation; 4) Simplified mathematical method of forecasting of the near the ground pressure and analysis of probability and justification; 5) Stabilized vertical movement at average level depending upon stratification of the atmosphere and local latitude, and a 6) supplemental component in the local pressure changes at the average level. *Subject Headings:* **1. Weather forecasting problems 2. Atmospheric pressure changes 3. Pressure field forecasting.**—*N.P.S.*

12L–171 551.509.31

Wiin-Nielsen, A. (*Air Weather Service, Suitland, Md.*), **Diagnosis of divergence in a three parameter numerical prediction model.** *Monthly Weather Review,* Wash., D. C., 89(3):67–7 March 1961. 5 figs., 2 tables, 6 refs., 5 eqs. **DWB, DLC**—The equation for the vertical velocit in a quasi-non-divergent, three-parameter model has been solved for a certain simple flow patter The importance of vertical variation of static stability and of the horizontal wind is discussed fro the solutions. Examples showing the distribution of divergence relative to the synoptic syste are computed and compared with those obtained by other investigators. A general discussion the factors influencing the mid-tropospheric divergence follows in section 4, and section 5 contai finally some remarks on the divergence in very long waves. *Subject Heading:* **1. Numeric forecasting models.**—*Author's abstract.*

12L–172 551.509.312:551.558:551.5

Wu, Yon-shen (*Nanking Univ.*), **A new method of computing vertical motion under th assumption of isallobaric wind.** *Acta Meteorologica Sinica,* Peking, 30(1):72–84, Feb. 195 9 figs., table, 8 refs., 7 eqs. In Chinese; English summary, p. 84. **DLC**—A new method of com puting vertical motion based on the assumption of isallobaric wind is proposed. Some qualitati rules for estimating the distribution of vertical velocity are given. These rules may be employe in routine forecasting. *Subject Headings:* **1. Forecasting techniques 2. Vertical motion com putations.**—*Author's summary.*

Dynamics Applied to Forecasting (551.509.313)

See also: **Objective methods of local forecasting** (Meteorological Magazine), 12L–94; **Long range weather forecasting** (Sadokov), 12L–517.

12L–173 551.511.32:551.509.3

Academia Sinica, Peking, Institute of Mathematics, **The initial value problem for a composi type equation.** *Acta Meteorologica Sinica,* Peking, 30(4):390–397, Nov. 1959. 4 refs., 5 eqs. Chinese; English summary p. 397. **DLC**—In connection with the weather forecasting, we consid the initial value problem for the equation of vorticity

$$\left(\frac{\partial}{\partial t}+\alpha(\theta)\frac{\partial}{\partial\lambda}\right)\Delta z+\beta(\theta)\frac{\partial z}{\partial\lambda}=0$$

where

$$\Delta\equiv\frac{1}{\sin\theta}\frac{\partial}{\partial\theta}\left(\sin\theta\frac{\partial}{\partial\theta}\right)+\frac{1}{\sin^2\theta}\frac{\partial^2}{\partial\lambda^2}$$

with the initial condition $z(\theta,\lambda,0)=z_0(\theta,\lambda)$. The required solution $z(\theta,\lambda,t)$ is bounded in the gion D.

$$0<t,\qquad 0<\theta<\pi,\qquad 0<\lambda<2\pi,$$

and periodic in λ with period 2π. Up to a constant term, the unique solution is found by a dir method. Without essential difficulty, the method used here may be applied to solve the vortic equation with more general coefficients. *Subject Headings:* **1. Vorticity equations 2. Numeri forecasting.**—*Author's abstract.*

12L–174 551.509.3

Ambrózy, Pál, **Elektronikus számológépek alkalmazása a nyomás numerikus elöj jelzésében.** [Use of electronic computers in numerical pressure forecasting.] *Időjárás,* Bu pest, 62(6):360–363, Nov./Dec. 1958. 2 figs., 4 refs., eqs. **DLC**—A general explanation of working principles of electronic computers, the nature of prognostic equations, and the functi of programming and coding. The procedure is illustrated by an example of a 700 mb short-ra forecast based on a barotropic equation. *Subject Headings:* **1. Numerical pressure forecast 2. Electronic computers.**—*G.T.*

12L–175 551.509.

Belousov, S. L., **K issledovaniiu pogreshnosteĭ chislennogo resheniia uravneniia peren vikhria na srednem urovne atmosfery.** [Research on errors in numerical solution of equati of transfer of vorticity in the middle levels of the atmosphere.] *Moscow. Tsentral'nyĭ Inst Prognozov,* Trudy, 78:73–82, 1958. fig., 3 refs., 31 eqs. **DWB**—The author presents a met of estimating errors arising during the numerical solution of the non-linear equation of vort transport at the mean level of the atmosphere. Only errors of approximation are considered s it is assumed that the entire calculation is carried out with a sufficiently large number of si

The dependence of errors of approximation on the temporal and spatial magnitudes of the difference intervals is examined. The magnitude of the approximation errors is determined by comparing the exact solution of the difference equation with one known solution of the differential equation demonstrated by E. P. Blinova. This exact solution is valid for initial geopotential fields of a special type. The method is applied also to the solution of the vortex equation for initial geopotential fields of a more general type. *Subject Heading:* **1. Numerical forecasting errors.**—*I.L.D.*

12L–176 551.509.313:551.515.23

Birchfield, Gene E., **Numerical prediction of hurricane movement with the equivalent-barotropic model.** *Journal of Meteorology,* Boston, 18(3):402–409, June **1961.** 4 figs., table, 7 refs., 3 eqs. Also issued as Chicago. Univ. Dept. of Meteorology, Contract Cwb9718, Technical Report No. 13, July **1960. DWB** (M15.2 C532te)—Equivalent-barotropic-model predictions of hurricane trajectories made with a 150-km grid mesh are presented. By a series of comparative tests, the results suggest that more accurate forecasts were obtained using density-weighted mean initial data than with 500-mb data. The importance of horizontal mesh size on the accuracy of the calculations is also shown. *Subject Headings:* **1. Numerical forecasting of hurricane movement 2. Hurricane movement forecasting 3. Equivalent barotropic models.**—*Author's abstract.*

12L–177 551.509.313:551.577:551.518.8

Bodolai, István, **Opyt kolichestvennogo prognoza osadkov pri prokhozhdenii teplogo fronta.** [Attempt at quantitative forecasting of precipitation during passages of warm air fronts.] *Időjárás,* Budapest, 64(1):13–20, Jan./Feb. **1960.** 2 figs., 2 tables, 3 refs., 2 eqs. English summary p. 13, Hungarian summary p. 20. **DLC**—A practical method is presented for the numerical forecasting of the precipitation from nonstationary warm fronts. The method is based on the consideration of vertical motion arising from frontal friction and vergence. It is stated that the precipitation released at the fronts is determined by the thermal structure of the front, the upslope convergence, the degree of saturation and the temperature. *Subject Headings:* **1. Quantitative precipitation forecasting 2. Numerical forecasting methods.**—*Author's abstract.*

12L–178 551.509.313

Brandejs, Stanislav, **Prognostické rovnice vícevrstvých modelů atmosféry.** [Prognostic equations of multi-layer models of the atmosphere.] *Meteorologické Zprávy,* Prague, 11(4/5):97–99, **1958.** 4 refs., 16 eqs. Czech, Russian and German summaries p. 97. **DWB, DLC**—In this article the basic prognostic equations relating to multi-layer atmospheric models are explained and procedures, used in their numerical integration are described. *Subject Headings:* **1. Baroclinic models 2. Numerical forecasting.**—*Transl. of author's abstract.*

12L–179 551.509.313:551.511:551.557:681.14:621.38

Brown, John A., Jr., and Neilon, James R., **Case studies of numerical wind analyses.** *Monthly Weather Review,* Wash., D. C., 89(3):83–90, March **1961.** 7 figs., 2 tables, 12 refs., 5 eqs. **DWB, DLC**—With the aid of an electronic computer, case studies of wind analyses at the 850-mb, 700-mb, 500-mb, 400-mb, 300-mb, and 200-mb pressure levels have been made. The divergent and nondivergent wind components resulting from the u and v wind-component analyses are investigated. For the cases considered, the stream-function fields are slightly superior to the Joint Numerical Weather Prediction operational fields, obtained initially through use of the "balance equation." The magnitude of the horizontal wind divergence values are comparable to those obtained from the winds by previous investigators employing hand-analysis techniques. However, the divergence patterns are not sufficiently accurate for the strict requirements necessary for numerical weather forecasting. *Subject Headings:* **1. Numerical forecasting 2. Numerical wind analyses.**—*Authors' abstract.*

12L–180 551.509.313

†Bryan, Kirk, Jr., **A numerical investigation of certain features.** (In: Massachusetts Institute of Technology. Dept. of Meteorology, Contract AF 19(604)-1000, **Final Report,** Dec. 31, **1957.** p. 562–635. 9 figs., 26 refs., 51 eqs.) **DWB**—The applications of numerical weather prediction as well as the experimental procedures are described. The existence of involved computations and the limitations of integration leading to any solution, are the basic disadvantages of the system. The present report includes discussions on the physical models, the harmonic forms of the expressions for energy, methods of numerical integrations and different solutions to prediction problems. *Subject Heading:* **1. Numerical forecasting.**—*N.N.*

12L–181 551.509.313:551.511.1

Bugaev, V. A., **Uravneniia dvizheniia, prigodnye dlia chislennogo integrirovaniia tseliakh prognoza gidrodinamicheskogo polia atmosfery.** [Equations of motion suitable fo numerical integration for the prognosis of the hydrodynamic field of the atmosphere.] *Sreo neaziatskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 1(16):3–3 **1959.** 2 figs., 24 refs., numerous eqs. **DWB**—(M(055) U581ts)—The author reviews cr tically various methods of numerical forecasting developed outside the U.S.S.R. Variou atmospheric models are proposed, their advantages and disadvantages and the forecasting equation derived from them and the successfullness of the forecasts obtained on the basis of the mode are examined. The papers on numerical forecasting reviewed are as follows, viz: the first pap of J. Charney and A. Eliassen (*Tellus,* No. 2:38–54, **1949**) in which the numerical integratio of the vorticity equation was used to forecast the profile of an isobaric surface along latitudin circles; the paper of J. Charney, R. Fjørtoft and J. von Neumann (*Tellus,* No. 2:237–25 **1950**) in which numerical properties of linearized barotropic equations were examined and t numerical integration of non-linear equation was carried out; the verification of the usefulness the barotropic vorticity equation for the numerical forecasting of AT_{500} maps by J. Charney a B. Bolin (*Tellus,* No. 4:248–257, **1951**); the paper of A. Eliassen (*Tellus,* No. 4(3), 195 on the use of the quasistatic approximation for selecting different atmospheric models and t development of the so-called continuous two parameter model with vertical stability; L. Sawyer and F. H. Bushby (*Jour. of Met.,* 10(1), **1953**) variant of the baroclinic 2½ fold mod of the atmosphere characterized by a specific form of different coefficients; the atmospheric mod of G. Árnason (*Tellus,* 4(4), **1952** and 5(3), **1953**) in which the vertical temperature gradie (static stability) varies both horizontally and temperately. The mean level and Árnason's mod Árnason's forecasting equation for, P_0, T_0 and Y (pressure temperature and vertical temperatu gradient respectively) and Árnason's qualitative prognostic rules are discussed. *Subject Heading* **1. Numerical forecasting 2. Atmospheric models.**—*I.L.D.*

12L–182 551.509.3

Charney, Jule G. (*M. I. T.*), **Hydrodynamics of the atmosphere and numerical weath predictions: a synthesis.** *National Academy of Sciences, Wash., D. C., Proceedings,* 45(12 1650–1655, Dec. **1959.** 4 figs., 17 refs. **DLC**—A discussion claiming that the work of rece years on the hydrodynamics of the planetary flow patterns in the atmosphere has made it possi to present a fairly coherent physical picture, or synthesis of the processes making up the gene circulation and to show by mathematical means that this synthesis does in fact explain the gr character of the general circulation. *Subject Headings:* **1. Numerical forecasting 2. Planeta flow patterns.**—*I.S.*

12L–183 551.509.313:551.515

Chicago. Univ. Dept. of Meteorology, **Hurricane movement prediction program w the JNWP Barotropic forecast model (octagonal grid).** Project Report No. 5 (Special I port, Contract Cwb-9227), [1958?] 5 p. 3 figs., 2 refs. **DWB** (M15.2 C532re)—Brief rep on project designed to predict 500 mb hurricane center trajectories using the steering met combined with the barotropic nondivergent model. Details of the data modification program (input and output data) and the trajectory computation program (input and output data). *Sub Headings:* **1. Numerical hurricane prediction 2. Hurricane trajectory prediction.**—*M.R.*

12L–184 551.509.313:551.515

Chicago. Univ. Dept. of Meteorology, **Research on numerical prediction of subtrop flow patterns and of hurricane movement.** Contract Cwb-9227, Project Report No. 6 (F Report), [1958] 6 p. Reproduced from typescript. **DWB** (M15.2 C532re No. 6)—Results numerical prediction investigation of hurricane movements conducted during Jan. 1–June 30, 1 are briefly reported. The studies included map analysis, construction of a baroclinic steer prediction model, and attempts at removing the truncation error from the Birchfield fine- model. *Subject Heading:* **1. Numerical hurricane prediction.**—*M.R.*

12L–185 551.509.313:551.509.317:551.509

Dushkin, P. K.; Lomonosov, E. G. and Lunin, Iu. N., **Opyt chislennogo prognoza vla nosti, oblachnosti i osadkov na vychislitel'noĭ mashine.** [Numerical forecasting of humi clouds and precipitation by a computing machine.] *Meteorologiia i Gidrologiia, Moscow,* 12:3–10, Dec. **1960.** 3 figs., 2 tables, 6 refs., 6 eqs. **DWB, DLC**—A trial forecast of c and precipitation using forecast pressure charts for 850, 500 and 300 mb, and computed va of the vertical flow and humidity. The pressures were forecast using the method of Bu and Marchuk. The vertical flow was calculated according to a method previously describe

the authors. Using the equation of diffusion of specific humidity and that for adiabatic heat flux an expression was obtained for the rate of change of the dew point depression. After some empirical approximations were made, a formula was derived for the numerical integration of this expression in steps of one hour. Forecast charts could then be prepared for the dew point depression. A nomogram was constructed which enabled a forecast of cloudiness or precipitation from the forecast values of the dew point depression and the vertical flow. This was obtained by an empirical examination of 500 cases. An accuracy of about 80% is claimed for the forecasting method. *Subject Headings:* **1. Numerical forecasting 2. Cloud forecasting 3. Precipitation forecasting 4. Dew point depression forecasting.**—*R.B.*

12L–186 551.509.313:551.542

Gromova, L. G. and Mashkovich, S. A., **Nekotorye rezultaty chislennogo prognozirovaniia baricheskogo polia na urovne moria i v sredneĭ troposfere.** [Certain results of numerical forecasting of the baric field at sea level and in the middle trophosphere.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 86:49–54, **1959.** 3 figs., 3 tables, 2 refs., eq. **DWB**—For the forecasting of pressure field on the layer near the ground and preparation of the map of absolute topography of the isobaric surface at 500 mb, two surface models of the atmosphere were used. The model was made with the assumption of a polytropic atmosphere. In this case the geopotential height of any isobaric surface might be represented as the function of geopotentials of two fixed surfaces. In other words it is possible to use, for forecasting the data of meteorological observations, only two atmospheric levels. The forecasting scheme was modified by the author in such a way that the first integral was computed by the Simpson method instead of the trapezium method and the computation was spread over a large area. The computations were made with the fast electronic computer "strela." The process of computation is described in the text with tabulated data and three synoptic maps. The analysis of the results and summary are appended. *Subject Headings:* **1. Numerical forecasting 2. Pressure field forecasting.**—*N.P.S.*

12L–187 551.509.313:551.513.1:551.515.23

Namias, Jerome (*U. S. W. B.*), **Forms of the general circulation as related to hurricane genesis and path.** (In Technical Conference on Hurricanes, Miami Beach, Fla., Nov. 19–22, 1958, **Proceedings,** issued 1958(?) Section A2 (11 p.) 8 figs., 19 refs.) **DWB** (M15.2 A512pr)—Anomalous forms of the general circulation control frequency and the life history of storms. Clues for predicting hurricanes well in advance are suggested. Positive examples of a numerical 5-day mean forecast of the 500 mb circulation pattern are given. *Subject Headings:* **1. Numerical hurricane forecasting 2.General circulation anomalies 3. Hurricane genesis.** —*W.N.*

12L–188 551.509.313:551.513(98)

†Namias, Jerome (*Ext. Fore. Sec., U. S. W. B., Wash., D. C.*), **Synoptic and climatological problems associated with the general circulation of the Arctic.** *American Geophysical Union, Transactions,* 39(1):40–51, Feb. **1958.** 12 figs., 21 refs. **DWB, DLC**—Reasonably complete analyzed maps at sea-level, 700-mb and 200-mb over the past decade have made possible a much improved picture of normal characteristics of the general circulation over polar regions including the interplay between synoptic and planetary scale patterns. Charts believed to represent fairly close approximations to long term normals are presented for Jan., April, July and Oct., and an attempt is made to associate prevailing circulations with characteristics of the underlying surface, with season, and with type of synoptic development. Large climatic fluctuations in circulation over periods of a month to a season are described and illustrated. The short-period (day to day) variations over the Arctic and the associated prediction problems appear to be of the same nature as those of temperature latitudes and are thus amenable to present numerical methods. Longer-period fluctuations pose a much more difficult problem. *Subject Headings:* **1. General circulation in Arctic 2. Synoptic analysis 3. Numerical forecasting 4. Arctic.**—*Author's abstract.*

12L–189 551.509.313:526.8

Phillips, Norman A. (*M. I. T.*), **A map projection system suitable for large-scale numerical weather prediction.** *Meteorological Society of Japan, Tokyo, 75th Anniversary Vol. of the Journal,* pub. Nov. **1957.** p. 262–267. fig., 2 refs., 23 eqs. **DWB, DLC**—The author develops a straight forward procedure to solve the finite-difference hydrodynamical equations for the entire globe (or a hemisphere). The mapping involves the combined mercator and stereographic grids and the use of cartesian coordinates to solve the equations of motion. The mercator projection should be used in low latitudes $-\bar{\theta} \leqslant \bar{\theta} \leqslant 0$, and two stereographic projections in high latitudes, centered at each pole. $\bar{\theta}$, is found to be approximately 43°16′. An example is worked out of interpolation on the stereographic grid to get data needed for computation on the mercator grid.

The number of grid points required to cover the hemisphere is computed for $P = 100$ (P d
termining the space increment) and found to be 1400 mercator grid points and 784 stereograph
grid points. *Subject Headings:* **1. Numerical hemispheric forecasting 2. Projections f
numerical forecasting.**—*A.V.*

12L–190 551.509.3

Phillips, Norman A. (*M. I. T., Cambridge, Mass.*), **Numerical integration of the primiti
equations on the hemisphere.** *Monthly Weather Review,* Wash., D. C., 87(9):333–345, Se
1959. 7 figs., 2 tables, 17 refs., 53 eqs. **DWB, DLC**—A 48-hr forecast for the entire Northe
Hemisphere of a barotropic hydrostatic atmosphere is made with the "primitive equations." Ove
lapping mercator and stereographic grids are used, together with the finite-difference scheme pr
posed by ELIASSEN. Initial data corresponded to a Haurwitz-type pattern of wave number
The initial wind field was nondivergent and the initial geopotential field satisfied the balan
equation. The computations seem to be stable and well behaved, except for two small tempora
irregularities. The amplitude of the gravity-inertia waves present in the forecast geopotential fie
is about 1/30 that of the large-scale field. It can be shown that this is due to the neglect, in t
initial data, of the quasi-geostrophically conditioned divergence field. The computational techniq
itself therefore, does not give any unreal prominence to the "meteorological noise." The co
putational characteristics and stability criterion of the ELIASSEN finite-difference system are inv
tigated for a linearized version of the equations. *Subject Headings:* **1. Hemispheric foreca
2. Numerical forecasting.**—*Author's abstract.*

12L–191 551.509.313:681.14:621.

†Phillips, Norman A. (*M. I. T.*), **Numerical weather prediction.** *Advances in Compute
N. Y., Vol. 1:43–90, 1960.* 3 figs., table, 99 refs., eqs. **DLC**—This paper is divided into fi
sections. The first section is devoted to introductory remarks giving a general impression of
magnitude of the problem. In the second section the data available for numerical prediction
described together with a description of the techniques now being used, and also a discussion
the physical and mathematical theory on which these techniques are based. Section three sho
how the basic equations must be simplified so as to apply only to the large scale motions. T
numerical technique of finite differences used for solving the non-linear partial differential equati
of the hydrostatic and geostrophic forecast systems, is discussed in the fourth section. The fi
section discusses first, results of numerical predictions with repect to the geostrophic system
then, describes several more recent experimental rsults and approaches to the problem. *Sub
Heading:* **1. Numerical forecasting.**—*I.S.*

12L–192 551.509.

Sawyer, John Stanley (*Meteorological Office, Great Britain*), **Some mathematical probl
in meteorology.** (In: **Mathematics, Education and Industry.** A conference of teach
research scientists and industrialists at the University of Liverpool, April 1959. Pub. Lon
Technology (The Times Publishing House Limited), **1960.** pp. 57–65. 15 eqs.—This is a sin
account of the basis of dynamic methods of numerical forecasting. The basic equations
listed. Scales of motion, in particular, sound waves, gravity waves and the larger scale atm
pheric motions, are discussed. Numerical forecasting methods with one, two or three param
models are very briefly outlined and some of the difficulties involved are noted. *Subject Head
***1. Numerical forecasting.**—*R.B.*

12L–193 551.509

Smagorinsky, J., **On the application of numerical methods to the solution of system
partial differential equations arising in meteorology.** (In: Langer, Rudolph R. (*ed.*), **Front
of numerical mathematics.** Madison, Univ. of Wisconsin Press, **1960.** p. 107–123, 42 r
DWB (510.82 L275fr)—The evolution of dynamic meteorology is surveyed from 1858, when
siderations of the Eulerian equations began, to the present time computing machines. The p
lems of using numerical techniques are dealt with and the limitations of computing machines
numerical techniques are discussed. It is emphasized that progress in meteorology is hind
by the fact that the atmosphere is virtually the only laboratory and its complexities cannc
duplicated adequately for testing purposes. The initial stages in computing must be done
pencil and paper; computing machines cannot replace mathematical and laboratory technique
analysis at this time. *Subject Heading:* **1. Numerical methods.**—*O.T.*

12L–194 551.509.313:551.511

§Wang, Yeh-Chun, **Graphical numerical prediction of the 1000-MB surface with
adiabatic warming. For eastern Pacific Ocean, Jan. 1956 and Jan. 1959. 1959.** Thesis

of Sci. in Met.)—U. S. Naval Post-graduate School, Monterey, Calif. 41 p. 22 figs., table, 5 refs., 20 eqs. **DWB** (M11.33 W246gr)—A two-level graphical-numerical prediction model is extended so as to incorporate some orographical and non-adiabatic warming or cooling effects in a manner such that almost no extra work is added. The model is applied to several cases in the eastern Pacific Ocean, Jan. 1956 and Jan. 1959 where non-adiabatic heat exchanges are pronounced. The resulting prognoses show a material improvement over a similar model which omits the non-adiabatic influence. *Subject Headings:* **1. Numerical forecasting models 2. Nonadiabatic heating 3. Eastern Pacific Ocean.**—*Author's abstract.*

12L–195 551.509.313:551.511

Watanabe, T., **Relations between the normal fields of divergence or convergence of the integrated atmosphere and the normal fields of heat or cold source.** *Journal of Meteorological Research,* Tokyo, 8(9):537–540, Oct. 1956. 2 figs., 4 refs., 22 eqs. In Japanese; English summary, p. 537. **DWB, DLC**—Assuming that the integrated wind velocity components along vertical are U, V, and that the integrated potential temperature along vertical is Θ, the equation of thermal integrated atmosphere is:

$$\frac{\partial \Theta}{\partial t} + \frac{\partial (u\Theta)}{\partial x} + \frac{\partial (V\Theta)}{\partial y} + \frac{1}{P_0}\frac{\partial}{\partial u}\int_0^{p_0} \theta' u' dp + \frac{1}{P_0}\frac{\partial}{\partial y}\int_0^{p_0} \theta' v' dp = \frac{1}{P_0}\int_0^{p_0} \frac{d\theta}{dt}\, dp,$$

where p_0 is the surface pressure, and θ', u', v' are the departures from the integrated values. The integrated potential temperature Θ is calculated by the following expression:

$$\Theta = \frac{1}{p_0}\int_0^{p_0} \theta dp = \frac{p_s \varpi}{p_0}\int_0^{\alpha_0} T d\alpha,$$

where $\phi_0 = 1000$ mb (standard pressure), $d = \dfrac{p_1 - \varpi}{1 - \varpi}$ and $\varpi = 0.2857$. Next, assuming the stationary barotropic atmosphere, the equation of thermal integral atmosphere is given by:

$$\frac{1}{p_0}\int_0^{p_0} \frac{d\theta}{dt}\, dp = \frac{g}{\lambda p_0}\frac{\partial (p_0 \Theta, z)}{\partial (x, y)},$$

where g is the acceleration of gravity, λ the Coriolis parameter and

$$U = -\frac{g}{\lambda}\frac{\partial z}{\partial y}, \qquad V = +\frac{g}{\lambda}\frac{\partial z}{\partial x}.$$

From the above equation, we see that the heat gain or loss of air column occurs in two courses: i.e., one is the divergence effect described by ΘQ, and its order is 10^{-5} C.G.S.; while the other is the advection effect described by $\dfrac{g}{\lambda}\dfrac{\partial (\Theta, z)}{\partial (xy)}$, and its order is 10^{-4} C.G.S. Here Q is the horizontal divergence of the integrated atmosphere. At last, the advection term is transformed as

$$\frac{\theta R T^2 g}{m H T_h}\frac{p_0}{p_h} Q,$$

where R is the universal gas constant, m the molecular weight of dry air, H the height of air column, p_h and T_h are the air pressure and the air temperature at the top of the air column of height H, respectively; that is, the advection effect is proportional to the horizontal divergence Q of integrated atmosphere. This theoretical result is examined in use of WEXLER'S result. *Subject Headings:* **Numerical forecasting 2. Barotropic models.**—*Author's abstract.*

12L–196 551.509.313:551.509.329:551.542:681.4:621.38

Belov, P. N., **Kratkosrochnyĭ prognoz poleĭ davleniia s primeneniem elektronnoĭ schetnoĭ mashiny "Pogoda."** [Short-range forecasting of pressure fields by means of the electronic computer "Pogoda."] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 86:3–41, 1959. 15 figs., 1 tables, 32 refs., 27 eqs. **DWB**—Precise method of the forecasting of the baric field is discussed with consideration of possible separation of many physical processes, interacting with changes in the atmospheric pressures. These processes are formulated with hydrodynamic equations into a system of non-linear differential equations for final solution. The first successful attempt in this direction was made by I. A. KIBEL' (ref. 13) with the hydrodynamic theory of forecasting exclusively of large size processes. Other methods listed in references are briefly reviewed with consideration of final mathematical equations or empirical and statistical functions of influences on the forecasts. The discussion also concerns the arrangement and distribution of the points of forecasts in view of proper covering of certain areas. The method of forecasting

atmospheric pressure by the empirical function of the influence is described with details a mathematic equations. Consideration is also given to formulation of pressure changes unc effects of the meteorological field elements and to selection of the atmospheric levels and syst of stations used for the forecasts. For example, for selection of independent equations of t data of 175 aerological soundings above Moscow are used for computating the coefficients correlation between the values of geopotential of different levels and mean square difference, the geopotential deviation from its mean value of different pairs of equations. The results w plotted on two charts for selection of suitable coefficient. Another problem is related to selecti of stations located at favorable distances. The discussion is illustrated on three maps of d tribution of the coefficient of correlation and mean square difference of deviation of the g potential (700 mb). Mathematical computation of the empirical function of influence on pressure field is described with tabulated evaluations of accuracy of developed equations of regr sion for the forecast of changes, of pressure at the sea level and geopotentials (700 mb) a (300 mb) for 24 and 36 hours in advance of 20 different points (cities). The technique preparation of the pressure forecast on the electronic computer "Pogoda" is described in det and with a few examples of the forecasts made on the basis of data marked on the perfora tape used in the computer and calculating machine in obtaining of the final result. Compu forecast pressure fields are illustrated on 15 weather maps and evaluation data assembled in tables. *Subject Headings:* **1. Short range forecasting 2. Pressure field forecasting 3 El tronic computers 4. Moscow, U.S.S.R.**—*N.P.S.*

12L–197 551.509.313:681

Clayton, William H.; Covey, Winton G. and Merryman, Jerry D., **Design of experimen meteorological simulators.** Texas. Agricultural and Mechanical College. Dept. of Ocean raphy and Meteorology, Contract DA-36-039-SC-74975, Third Quarterly Progress Report, J 1–Aug. 31, 1958. Issued Oct. 1958. 66 p. 6 figs., 4 tables, 13 refs., eqs. **DWB** (M09 T355 —The contract effort, which has consisted of two main parts, is reviewed. The first part, construction of the Boundary Layer Wind Simulator, is not discussed in detail. The second p the completion of research begun in the first and second quarters toward development of a m orological model for an electronic analog computer (simulator) covering the vertical range fr —2 to 1000 m, is reported sufficiently to demonstrate completeness of the model in the mat matical and meteorological sense. *Subject Headings:* **1. Analog computers 2. Boundary la wind simulator.**—*Authors' abstract.*

12L–198 551.509.313:551.

Diubiuk, A. F., **K zadache prognoza baricheskogo polia po polnoĭ sisteme uravn gidromekhaniki.** [Problem of forecasting the perssure field from a full system of hydromech cal equations.] *Akademiia Nauk SSSR, Isvestiia, Ser. Geofiz.*, No. 11:1642–1648, Nov. 1 ref., 24 eqs. Russian summary p. 1642. Transl. into English in the corresponding number of *Bulletin of the Academy of Sciences, U.S.S.R., Geophysics Series.* **DLC**—Certain general tions and simplifications for the solution of short term forecasting problem, offered by the aut in his previous work are investigated. The article represents a purely analytical treatment of subject. Included are: consideration of horizontal and vertical components of Coriolis force; case of recurrent system with inclusion of the internal friction; solution of the problem in system of spherical coordinates within the local conditions. *Subject Headings:* **1. Pressure f forecasting 2. Hydromechanical equations 3. Short range forecasting.**—*B.J.G.*

12L–199 551.509.313:551.509

Dubov, A. S. and Stoliarova, G. V., **Opyt prognoza temperatur gidrodinamichesk metodami.** [The experiment of temperature prediction by hydrodynamic methods.] *Leningr Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 76:30–39, 1958. 3 figs., 6 tables, 4 r **DWB**—The minimum night temperatures for Leningrad, Pushkin, Pskov, etc., were forecas 1956, 12–15 hours in advance with the aid of the method of M. E. Berliand as modified M. V. Zavarina. The "local" components of temperature change produced by the initial co tions and radiational factors are supplemented with advective temperature changes. In compu the advective temperatures, the advection for 12 hours was determined from the vertical isoh field at 850 mb, without considering the possible reconstruction of the field. The advection determined on the basis of variations of 850–1000 mb. The computations of nocturnal minim temperature 12–15 hours in advance gave a mean error of about 2°C; and the curve of e distribution showed that errors exceeding 5% are encountered only in 12% of the cases. Twe four hour forecasts of temperatures at 0300 and 1500 o'clock involved the determination of perature advection for 24 hours and introducing correlations for transformation by means $\Delta T_{tr} = b\Delta T_0 + a\Delta R_0$ where ΔT_0 = temperature difference between final and initial points of

trajectory at the initial moment of time; $\Delta R =$ difference between radiation balance of the final point of the trajectory at the final moment and the initial point at the critical moment; a and b coefficients depending upon advection velocity, characteristics of the surface, etc. The results of forecasts of maximum and minimum temperatures show that the errors for 24 hour forecasts of 0300 o'clock minimum are greater than those for nocturnal minima. *Subject Headings:* **1. Temperature forecasting 2. Hydrodynamic methods**—*I.L.D.*

12L–200 551.509.313

James, D. G. and Smith, R. C., **Twenty-four forecasts by the method of Estoque.** *Meteorological Magazine,* London, 88(1044):171–176, June 1959. 2 figs., 2 tables, 4 refs., 3 eqs. **DWB, DLC**—The paper reports an experimental application of Estoque's graphical integration method to obtain forecasts at 1000 mb. The basic equations representing the method are given. Some additional assumptions, considered necessary for the purpose are also listed. A test of the method carried out at the Forecasting Research Division at Dunstable is described and some of its details are tabulated and graphically represented. The forecasts were made from 0300 G.M.T., and data collected for 24-hour periods each weekday from Oct. 15 to Nov. 9, 1956. The accuracy of the forecasts was assessed by comparison with actual charts and with those prepared on more conventional lines by the Central Forecasting Office. It was found that the latter are better than the Estoque forecasts which, in turn, are better than could be obtained by a forecast of persistence. The advection process is held as one of the sources of error in Estoque's method. *Subject Headings:* **1. Estoque's graphical forecast method 2. Forecast evaluations 3. Dunstable, Eng.**—*I.S.*

12L–201 551.509.313:551.509.327:551.515.23

Laio, Shue-yih, **An application of steering hypothesis in making a forecast on the movement of Typhoon Grace.** *Meteorological Bulletin,* Taipei, Formosa, 5(2/3):6–12, 1959. 10 figs., table, 12 refs., 18 eqs. In Chinese; English summary p. 6. **DLC**—Recent hypothesis in choosing a steering level and current, for making a forecast on the movement of tropical storms has become popular and has been supported by many authors. The basic idea and its theoretical background derived by SIMPSON has been discussed in a comparative way. The computation on correlation coefficients between the direction of movement of typhoons and wind directions at some selected isobaric levels made by SUZUKI, TAKAHASHI and OKUDA showed good agreements particularly at 700 mb level. The steering level should be chosen at 500 mb where the location of the forecasting station is located to north 30° latitude. Regarding the choosing of steering current, the value of Fjørtoft's method has also been mentioned. An application of steering hypothesis in making the forecast of the movement of Typhoon Grace has been worked out in this paper. A few results have been obtained as follows: 1) By using the warm-tongue steering method, the thickness pattern of the layer between 850 mb and 500 mb would be better than in use the thickness pattern between 700 mb and 500 mb; 2) When the steering level and current are assumed to be constant the conservation of the space mean field at pressure level of 700 mb agrees more closely to the movement of typhoons at least during the period of coming twelve hours. *Subject Headings:* **1. Typhoon forecasting 2. Typhoon "Grace' 3. Steering hypothesis.**—*Author's abstract.*

12L–202 551.509.313

Masuda, Y. (*Met. Res. Inst., Tokyo*), **On a tentative method of smoothing of contour height by the finite-difference smoothing operators.** *Meteorological Society of Japan, Tokyo, 75th Anniversary Vol. of the Journal,* pub. Nov. 1957. p. 95–102. 9 figs., 3 refs., 19 eqs. **DWB, DLC**—In order to filter out small scale disturbances in the contour field, a tentative method of smoothing is proposed. This method is specified by the finite-difference smoothing operators combined with two sorts of single smoothing operators. Only by one or two times iterations of this combined finite-difference operator, the small scale disturbances are filtered out almost completely, and at the same time, the large scale ones are retained essentially unchanged. *Subject Headings:* **1. Contour height smoothing 2. Smoothing methods.**—*Author's abstract.*

12L–203 551.509.133:681.14:621.38

Nemchinov, S. V., **Issledovanie resheniia uraveniia dlia prognoza baricheskogo polia atmosfery.** [Investigation of the solution of the equation for forecasting the pressure field of the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.,* No. 11:1635–1641, Nov. 1960. 5 refs., 3 eqs. Russian summary p. 1635. Transl. into English in the corresponding number of its *Bulletin of the Academy of Sciences, U.S.S.R., Geophysics Series.* **DLC**—The solution of a system of differential equations with derivatives of second power, with constant coefficients is investigated. This system of equations was derived by the author in his previous work. The properties of the roots of characterizing equation of this system are established. The connection of roots with atmospheric processes under the condition of quasi-geostrophic approximation, for the

basic system of thermodynamic equations is likewise established. All investigations are done
great detail. The main difficulty in practical application of the solution is discussed and
methods of simplifications are suggested. The advantages of use of the electronic computer
indicated. *Subject Headings:* **1. Pressure field forecasting 2. Electronic computers.**—*B.J.*

12L–204 551.509.313:551.509.3

Ovsiannikov, V. V., **O gidrodinamicheskom metode prognoza vlazhnosti, oblachnosti
atmosfernykh osadkov.** [A hydrodynamic method of forecasting humidity, cloudiness and p
cipitation.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 11:1684–1687, Nov. **1960.** 3 fi
5 refs., 3 eqs. Transl. into English in the corresponding number of its *Bulletin of the Acade
of Sciences, U.S.S.R., Geophysics Series.* **DLC**—The forecast of humidity, cloudiness and p
cipitation is based on relations which, without taking into consideration turbulence, may be
pressed by certain equations with corresponding boundary conditions. These equations are writ
and annotations therein are explained. The method of solution and initial data required for it
indicated and analyzed in details. Three maps of the same area are shown for comparison of
observed state of atmosphere with that forecast. The magnitude of the coefficient of correlat
is indicated. *Subject Headings:* **1. Hydrodynamic forecasting methods 2. Humidity fo
casting 3. Cloudiness forecasting 4. Precipitation forecasting.**—*B.J.G.*

12L–205 551.509.313:551.509.33(

§Reed, Richard J., **Results of a series of dynamical predictions for the Arctic: winter s
son.** Washington. Univ. Dept. of Meteorology and Climatology, Contract AF 19(604)-30
Scientific Report No. 8, Sept. **1959.** 50 p. 9 figs., 5 tables, 14 refs., eq. **DWB**—Results c
series of 24 hour forecasts of 1000 mb and 500 mb height, and 1000-500 mb thickness for
area north of 60 degrees are presented for the period Dec. 18, 1956–Jan. 7, 1957. The forec
were based on graphical integrations of a two-level baroclinic model and both an approximate
exact method were used to convert vorticity changes to height changes. From the time corr
tions and the corresponding root-mean-square errors it appeared, that the method performed
in or near regions where the observed root-mean-square pressure or height changes were larg
Definite evidences of orographic and nonadiabatic heating effects were found. In general
results support Estoque's views regarding the feasibility of dynamical prediction in the Ar
The daily analyses and progress charts for the 20 day period are appended. Numerical res
are compared with other studies. Tables show correlation between predicted and observed he
changes; verification of 500 mb forecasts; verification of thickness forecasts and the spatial
tribution of the correlation coefficient between observed and predicted height changes. *Sub
Headings:* **1. Forecast verifications 2. Orographic effects 3. Nonadiabatic heating eff
4. Arctic winter season 5. Arctic.**—*E.Z.S.*

12L–206 551.509.313:551.558:551.576.2:551

Sanders, Frederick; Wagner, A. James and Carlson, Toby N., **Specification of cloudin
and precipitation by multi-level dynamical models.** Massachusetts Institute of Technol
Dept. of Meteorology, Contract AF 19(604)-5491, Scientific Report No. 1, Sept. **1960.** 11
82 figs., 15 refs., 41 eqs. **DWB**—The relationship of cloudiness and precipitation to the ver
motion as computed by quasigeostrophic multi-level numerical models was studied. In orde
determine the effects of high resolution in the vertical, both a two-parameter and a ten-l
model was used. The models were applied to two storms of a contrasting nature. One wa
intense northeastward-moving baroclinic cyclone and the other was a weak lee-side develop
under predominantly zonal conditions. Geopotential height tendencies at the 950 mb level
puted by the ten-level model seemed to be more accurate than those computed by the two-param
model, as determined by comparison with observed surface pressure tendencies. The exce
was in the high elevations of the Rockies, where both models did rather poorly. Mid-tropospl
height tendencies were reasonable compared to the observed 12-hour 500 mb height changes,
the ten-level model doing slightly better than the two-parameter one. Cloudiness and precipit
were best related to the vertical motion in the middle and upper trophosphere. The vertical m
as calculated by the ten-level model was not significantly better correlated with observed cl
ness and precipitation than that calculated by the two-parameter model. Vertical cross sec
through the frontal layers indicated a good correlation between the cloudiness, vertical mo
as computed from the ten-level model, and the orientation of the frontal zone, as shown by
potential temperature fields. This analysis was made using only the vertical motion as
puted by the ten-level model, but it was believed that the two-parameter model would not
given such good resolution in the vertical. Quantitative calculations of precipitation were
for the intense storm. The computed amounts were in excess of the observed totals to the n
west of the storm center, but grossly deficient in the warm sector. It was believed that

rrors were due to the use of a stability parameter which was constant in the horizontal, the use f the geostrophic assumption; and to the presence of circulations on a smaller scale than that etectable by the present network of radiosonde stations. *Subject Headings:* **1. Dynamic instaility forecasting 2. Cloudiness 3. Precipitation 4. Vertical motion.**—*Authors' abstract.*

12L–207 551.509.313:551.509.311

Sanders, Frederick (*ed.*), **Synoptic application of dynamical concepts.** Mass. Institute f Technology, Dept. of Meteorology, Contract AF 19(604)-1305, Final Report, Feb. 28, **1959.** 2 p. 4 appendixes with separately numbered figs., tables, refs., eqs. **DWB**—A wide range of opics was investigated in the program of research directed towards the application of dynamical rinciples to short-range weather forcasting. A study of divergence and vertical motion as detrmined by the kinematic technique indicates that these quantities are rather irregularly disributed in the vertical. In the context of relative frequencies, thickness value was found to be function of station elevation and of the continental or maritime exposure of the station. Thunderstorm frequency in relation to Showalter Stability Index was also studied. In the study f frontogenesis it was found that the release of latent heat in the rising warm air contributed p the maintenance of an intense frontal zone. Barotropic prediction model could be applied for redicting the motion of hurricanes. An evaluation was made of probabilistic forecasts of terminal eather conditions prepared by subjective methods. Lastly, high frequency fluctuations of weather lements are studied. *Subject Headings:* **1. Short range forecasting 2. Thunderstorm frequencies 3. Frontogenesis 4. Barotropic models.**—*I.S.*

12L–208 551.509.313:681.14

Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, **Design of experimental meteorological simulators.** Contract DA-36-039 Sc-74975, Second Quarterly Progress Report, March 1–May 31, 1958. Pub. June **1958.** 16 p. 4 refs., 15 eqs. **DWB** (M09 T35qu)—This report is a review of project activities during the second quarter of he contract period. These have primarily consisted of meteorological and engineering investigaions necessary to the selection of a design for a general meteorological simulator. *Subject Headng:* **1. Meteorological simulators. I. Clayton, William H. II. Covey, Winton G. III. Merryman, Jerry D.**—*Author's abstract.*

12L–209 551.509.313:551.509.329:551.542

§Wirkus, Feliks (*State Inst. Hydrology and Met., Warsaw*), **O sprawdzalności nowej graicznej metody prognozy przyziemnego pola ciśnieniia.** [Tests of a new graphical prognosticaion method of the surface pressure field.] *Acta Geophysica Polonica,* Warsaw, 8(1):21–25, 960. 2 figs., table, 2 refs., 2 eqs. Polish summary p. 21; English summary p. 25. **DWB, DLC**—Results of 106 verifications of a new graphical method for prognosticating the surface pressure ield, the Estoque graphical and the inertial methods are presented. The correlation coefficient etween the prognosticated and the actual field was taken as the criterion of the quality of the rognostication. Mean values of the correlation coefficient obtained here: New method = 85.4%; stoque Method = 82.8%; and the Inertial method = 76.7%. The new graphical method is exlained and compared graphically with the older methods. *Subject Headings:* **1. Prognostic chart ccuracy 2. Prognostic chart preparation 3. Pressure field forecasting methods.**—*E.Z.S.*

12L–210 551.509.313:551.509.324:551.577.2

Yasuda, K., **An estimation of the precipitation amount due to convergence.** *Journal of Meteorological Research,* Tokyo, 10(12):1025–1029, Dec. **1958.** 10 figs., 3 refs. 6 eqs. In apanese; English summary p. 1025. **DWB, DLC**—The precip. amount due to the convergence f air was estimated by the use of K. R. Peterson's method, in which the simplified 1000 mb rorticity equation was employed to get the horizontal convergence at the surface. An example s shown by which the sum of the amount of precip. thus obtained, and that due to orography, nearly coincided with observed one. *Subject Headings:* **1. Precipitation forecasting 2. Rainall estimates 3. Horizontal convergence at the surface.**—*Author's summary.*

12L–211 551.509.313:551.511.3

Yeh, Tu-Cheng (*Inst. of Geophysics and Met., Academia Sinica Peking, China*), **On the ormation of quasi-geostrophic motion in the atmosphere.** *Meteorological Society of Japan, Tokyo, 75th Anniversary Vol. of the Journal,* pub. Nov. **1957.** p. 130–134. table, 10 refs., 11 eqs. **DWB, DLC**—Discussion of the physics of the formation of quasi-geostrophic motion in the tmosphere. Starting from equations of Charney, Kibel', Rossby, Obukhov and Raethjen he author shows: 1) that the fundamental reasons for the occurrence of geostrophic motion in he atmosphere are: (a) the layer of atmosphere on which the meteorological phenomena are con-

cerned is very thin; and (b) the ratio of the temperature contrast produced by radiation to square of the rate of earth's rotation, is small; 2) when the quasi-geostrophic equilibrium br down, then for small scale motion it is the pressure field which changes to fit the new velo field to attain new quasi-geostrophic motion; for very large scale it is the velocity field w changes more; and for intermediate scale both fields will change. *Subject Headings:* 1. G strophic equations 2. Geostrophic motion in the atmosphere.—*A.V.*

12L–212 551.509

Blinova, E. N., **Uchet nelineinykh chlenov v uravneniiakh termogidrodinamiki pri res zadachi o dolgosrochnom prognoze meteorologicheskikh elementov.** [Calculating nonlinear t in the thermohydrodynamic equations used in long-range forecasting of meteorological eleme *Akademiia Nauk SSR, Institut Fiziki Atmosfery, Trudy*, No. 2:54–65, 1958. 2 figs., 1 table, 2 29 eqs. **DLC** (Slavic)—In this theoretical mathematical paper dealing with non-stationary scale processes, the author develops a method for forecasting the index of circulation by taking account nonlinear terms in the equations of hydrodynamics, as it is well known in the linear cas derivative of the index of circulation with respect to time is always equal to zero. In the soluti the equation for long range forecasting of pressure, temperature and wind, the earth is consider a rotating sphere with angular velocity w and the atmosphere rotates together with the earth r = tance to the center of the earth, θ = complement of latitude, and λ = complement of longi V_θ and U_λ = velocity components along the θ and λ axes at some mean troposphere level 3–5 then the vortex equation for this level is:

$$\frac{\partial \Delta\psi}{\partial t} + \frac{1}{a^2 \sin\theta}\left(\frac{\partial \phi}{\partial \theta}\frac{\partial \Delta\psi}{\partial \lambda} - \frac{\partial \psi}{\partial \lambda}\frac{\partial \Delta\psi}{\partial \theta}\right) + 2w\frac{\partial \psi}{\partial \lambda} = \frac{1}{a^2 \rho T}\frac{1}{\sin\theta}\left(\frac{\partial p}{\partial \theta}\frac{\partial T}{\partial \lambda} - \frac{\partial p}{\partial \lambda}\frac{\partial T}{\partial \theta}\right)$$

$$\frac{\partial V_\lambda}{\partial t} + \frac{V_0}{a \sin\theta}\frac{\partial}{\partial \theta}(\sin\theta V_\lambda) + \frac{V_\lambda}{a \sin\theta}\frac{\partial V_\lambda}{\partial \lambda} + 2w\cos\theta V_\theta = -\frac{1}{a\rho \sin\theta}\frac{\partial p}{\partial \lambda}$$

and the equation of heat advection

$$\frac{\partial T}{\partial t} + \frac{V\theta}{a}\frac{\partial T}{\partial \theta} + \frac{V_\lambda}{a \sin\theta}\frac{\partial T}{\partial \lambda} = \frac{1}{a^2 \sin\theta}\left[\frac{\partial}{\partial \theta}\left(\sin\theta K \frac{\partial T}{\partial \theta}\right) + \frac{1}{\sin\theta}\frac{\partial}{\partial \lambda}\left(K\frac{\partial T}{\partial \lambda}\right)\right] + Q.$$

The solution of these equations, the derivation of forecast formula is illustrated. *Subject Hea* 1. Long range forecasting 2. Forecast formulas.—*I.L.D.*

12L–213 551.509.313:551558.2:551

Buleev, N. I. and Marchuk, G. I., **O dinamike krupnomasshtabnykh atmosfernykh prote** [The dynamics of large-scale atmospheric processes.] *Akademiia Nauk SSSR. Institut Atmosfery, Trudy*, No. 2:66–104, 1958. 20 figs., 9 refs., numerous eqs. **DLC** (Slavic)—The au review various attempts to forecast weather by means of the equations of hydrothermodyn beginning with the work of RICHARDSON and including the work of KIBEL', CHARNEY, ERTE They attempt to obtain general equations for the variations of pressure and temperature an equations for vertical currents taking into account all the fundamental factors of the bar atmosphere. The dynamic factors in temperature variations are considered more fully th previous studies. The system of equations of hydrothermodynamics was applied to large atmospheric processes. This sytem is distinguished from the usual equations of hydrodynam the presence of the deviating force of the earth's rotation in the equations of motion. The deri of the non-linear system of differential equations is illustrated, namely

$$\frac{\partial \Delta x}{\partial t'} + \frac{g}{l}(z, Dz) + \beta\left(\frac{\partial z}{\partial x'}\right) = \frac{l^2}{g}\frac{\partial \tau}{\partial p},$$

$$\frac{\partial T}{\partial t'} = \frac{g}{l}(T, z) + \frac{\epsilon}{cp} + \frac{R(\gamma_a - \gamma)}{g}\frac{T}{p}\tau,$$

$$\frac{\partial z}{\partial p} = -\frac{R}{g}\frac{T}{p},$$

$$(A, B) = \frac{\partial A}{\partial x'}\frac{\partial B}{\partial y'} - \frac{\partial A}{\partial y'}\frac{\partial B}{\partial x'}.$$

Together with the boundary conditions $\tau = 0$ when $p = 0$ and $\tau = gp_0\frac{\partial t_0}{\partial t'}$, when $p = p_0$ and data are adequate for determing future pressure, temperature and vertical currents. Th derivatives $\frac{\partial z}{\partial t'}, \frac{\partial T}{\partial t}$ and also the function τ for a given distribution of pressure and temperatur

e found by applying the method of Fourier-Bessel for solving the derivation with respect to time a function of the height and vertical velocity by integrating weighted advected vortices and temeratures over the entire area. The influence functions are presented in an analytic form in that ie working formulas can be used to solve a series of meteorological problems. *Subject Headings:* **Large scale atmospheric processes 2. Weather forecasting equations.**—*Author's summary and L.D.*

12L–214 551.509.313:551.557:551.542.1:681.14:621.38

Bykov, V. V., **Ob uchete otkloneniia vetra ot geostroficheskogo pri prognoze meteorologicheskikh ementov.** [Calculation of deviations from geostrophic winds for forecasting meteorological elents.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, 78:83–91, **1958.** fig., 8 refs., 21 eqs. **WB**—The problem of forecasting pressure fields and wind is solved on the assumption of quasilenoidal variation, i.e. motion in which the horizontal component of wind velocity is expressed ily by stream function reduced in a spatial case to the solution of the following system of equations:

$$Dq - \frac{l^2}{Pg}\frac{\partial \tau}{\partial \zeta} = A; \qquad \frac{\partial r}{\partial \zeta} + \frac{c^2}{Pg\zeta^2}\tau = B$$

$$Dq + \frac{2q}{l^2}\left(\frac{\partial^2\psi - \partial^2 q}{\partial x^2 \partial y^2} + \frac{\partial^2\psi \partial^2 q}{\partial y^2 \partial x^2} - 2\frac{\partial^2\psi}{\partial x \partial y}\frac{\partial^2 q}{\partial x \partial y}\right) + \frac{\beta \partial q}{l \partial y} = \Delta r$$

$$\Delta\psi + \frac{2q}{l^2}\left[\frac{\partial^2\psi}{\partial x^2}\frac{\partial^2\psi}{\partial y^2} - \left(\frac{\partial^2\psi}{\partial x \partial y}\right)\right] + \frac{\beta \partial \psi}{l \partial y} = \Delta z.$$

n this article there is presented one of the variants of numerical forecasting of this system of equaons by means of an electronic computer. The outline developed is applicable to a layer model of ie atmosphere. *Subject Headings:* **1. Geostrophic winds 2. Pressure field forecasting 3. Vind forecasting 4. Numerical forecasting.**—*I.L.D.*

12L–215 551.509.313:551.511:551.43

Chu, Yün-t'i, **Ob uchete dinamicheskogo vliianiia gornykh massivov v nelineinoi zadache dolosrochnogo prognoza meteorologischeskikh elementov.** [Consideration of the dynamic effect of ountain ranges in the non-linear problems of the long-range forecasting of meteorological elements.] *kademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 12:1807–1820, Dec. **1959.** 9 figs., 7 refs., 38 eqs. ussian summary p. 1807. **DWB, DLC**—The solution of the non-linear forecasting problems taking to account the effect of relief on the development of large scale processes in a baroclinic atmosphere presented. From the initial equation of the transport of velocity and advection of heat (outside the boundary layers the process is adiabatic) in spherical coordinates, the author derives the quation:

$$\Delta\frac{\partial \psi}{\partial t} + \frac{1}{T}\frac{\partial}{\partial \xi}\left(\xi^2\frac{\partial^2\psi}{\partial \xi \partial t}\right) = \frac{1}{a^2 \sin\theta}(\psi, L)$$

here

$$L = -\frac{1}{T}\frac{\partial}{\partial \xi}\left(\xi^2\frac{\partial \psi}{\partial \xi}\right) - \Delta\psi - 2a^2\omega\cos\theta$$

ψ = stream function $\xi = p(z)/P$, P = standard pressure at sea level). The solution of this equaon for the limiting condition where $\tilde{\rho}\omega = 0$ at the upper boundary of the atmosphere so that the miting condition is $\xi(\partial^2\psi/\partial\xi\partial t)$ bounded at $\xi = 0$; and the flow of the air stream around and across ie mountains are reduced to a condition where the vertical velocity on the surface of the mountains atifies the relationship $\omega = \frac{v}{a}\frac{\partial h}{\partial \theta} + \frac{u}{a\sin\theta}\frac{\partial h}{\partial \lambda}$; the limiting condition has the form $\frac{\partial^2\psi}{\partial\xi\partial t} = f$ for $\xi = 1$

here

$$f = \frac{1}{a^2\sin\theta}\left\{\frac{2a^2 T g\omega\cos\theta}{RT_1\xi_h}(\psi, h)_{\xi=\xi_h} - \left(\psi, \frac{\partial\psi}{\partial t}\right)_{\xi=\xi_h}\right\}$$

he solution of the problems for these limiting conditions is illustrated and the calculation of values or the Green function is presented. *Subject Headings:* **1. Long range forecasting 2. Topographic ifluences.**—*I.L.D.*

12L–216 551.509.313:551.558.2:551.571

Dobryshman, E. M., **Nekotorye zadachi vlagooborota v protsessakh bol'shogo masshtaba.** Problems of moisture exchange in large-scale processes.] *Moscow. Tsentral'nyi Institut Prognozov, rudy*, No. 60: 32–36, **1957.** 2 figs., 3 eqs. **DWB** (M(055) U581tts) Transl. into Eng. by A. Nurklik sued as *Canada. Meteorological Branch, Meteorological Translation*, No. 2:32–36, **1957.**—Recent

studies indicate that such mean characteristics as monthly mean anomalies of precipitation over l areas coincide in general with regions of ascending atmospheric motions. Hence, in constructing range forecasts of the humidity field by hydrodynamic methods, the large scale vertical mot must be considered. The method of linearization of equations is the best suited for solving stationary problems for long range forecasts. The principal role in the distribution of water v in the troposphere is played by turbulent mixing and the pressure of "currents" for the zonal di bution of moisture is:

$$\frac{\partial}{\partial z} k'(z) \frac{\partial \bar{\tau}}{\partial z} + \frac{k''}{r_0^2} \frac{1}{\sin\vartheta} \frac{\partial}{\partial \vartheta} (\sin\vartheta \tau) = C^2 \tau$$

τ = dew point (characteristic of moisture); z = vertical coordinate; ϑ = complement to latit k' and k'' = coefficients of vertical and horizontal turbulent exchange, $l_0 = 6.3.10^6$ meters; C^2 = c acteristic thickness of "flows." This equation is solved in the form

$$\tau(z,\vartheta) = \sum_{n=0}^{\infty} {}_n(\bar{\tau}z) P_n(\cos\vartheta)$$

where P_n = Legendre polynominal. The distribution of humidity was found to be satisfact approximated by the formula

$$\tau(z,\vartheta) = \bar{N}(z) + M\tau(z) \sin^2\vartheta$$

The linearized equation for forecasting humidity (dew point) in the simplest case has the follo form

$$\frac{\delta \tau'}{\delta t} + \alpha \frac{\delta \tau'}{\delta n} = - \frac{v'\vartheta}{r_0} \frac{\partial \bar{\tau}}{\partial \vartheta} - v_z \frac{\partial \bar{\tau}}{\partial z}$$

where t = time; λ = geographical longitude; α = circulation index; v_ϑ' and v_z = component v ties corresponding in meridian and height and varying with time; the monomial solution of this tion is written in the form

$$x\overline{\tau_{jn}^m} = \left\{ C_{0n}{}^m p_n{}^m(x) + \frac{i}{m(\sigma_{jn} + \alpha)} e^{-im(\sigma_{jn}\alpha)t} - 1) \right.$$
$$\left. \times [F_{jn}{}^m p_n{}^m(x) + G_{jn}{}^m p_n{}^m - 2(x) + K_{jn}{}^m p_{n+2}{}^m(x)] \right\} e^{-in}$$

Here j, n, m = integral numbers; $p_n{}^m(x)$ = added Legendre polynomial; $m\sigma_{jn}$ = characte number obtained in solving the problem for v_ϑ' and v_2; $F_{jn}{}^m$, $G_{jn}{}^m$ = function of height propor to the coefficients of resolution in a series according to spherical functions of the deviation initial fields of pressure and temperature from climatic values; $C_{0n}{}^m$ = coefficients of resolut the deviation of the moisture field in the initial moment. An example of a forecast is prese *Subject Headings:* **1. Large-scale vertical motion 2. Moisture exchange 3. Numerical range forecasting.**—*I.L.D.*

12L–217 551.509.313:551.509.329:5

Dobryshman, E. M., **O reshenii uravneniia dlia izmeneniia geopotentsiala.** [Soluti equations for variations in geopotential.] *Moscow. Tsentral'nyi Institut Prognozov, Trud* 78:92–104, 1958. fig., table, 6 refs., numerous eqs. **DWB**—The present numerical method of range forecasting of the pressure field is reduced usually to solving the equations for $\partial z/\partial t$ loc rivative of height of the corresponding isobaric surface. This equation for $\partial z/\partial t$ is represen the form

$$L\left(\frac{\partial z}{\partial t}\right) = F(x,y,\zeta); z(x,y,\zeta,t)$$

where L = linear differential operator acting only in coordinates; F contains nonlinear term into account vortex advection in case of a nonbarotropic model-temperature and also a linea including the variation of Coriolis force with latitude; X, y = horizontal coordinates; ζ = non-dimensional vertical coordinate; p = pressure at level z and P_0 = standard pressure surface of the earth $\approx$ 1000 mb. In this article the common operator L is expanded at the e of the linear term taking into account the variation of the Coriolis parameter with latitude fundamental quantitative characteristics of the solution are determined with the aid of a baro model in Cartesian coordinates and a variant solution for a baroclinic model in spherical coor is presented. *Subject Headings:* **1. Numerical forecasting 2. Short range forecasting.**—*I.L.*

12L–218 551.509.313:551.509.54.2:551.577.2/3(473)

Dmitrieva, G. V. and Karpova, V. M., **Opyt operativnogo rascheta kolichestva osadkov ia Moskvy.** [Experience in operational calculation of amount of precipitation at Moscow.] *oscow. Tsentral'nyi Institut Prognozov, Trudy,* No. 83:42–44, **1959.** table, 4 refs. **DWB**—orecasting of precipitation is the most difficult part of weather forecasting due to accounting of any factors related to the cloud formation and fall of precipitation. A practical method of com-itation is developed by A. A. Bachurina and Z. L. Turketti, particularly in connection with e study of conditions for formation of precipitation during cold seasons of nonconvectional haracter. Three basic factors participating in the formation of precipitation were considered for e forecasting: 1) adiabetic air cooling at stabilized vertical movements; 2) absolute and relative midity of air moving to given region; and 3) nonadiabatic temperature changes at heat trans-rmation (heating or cooling). The practical process of forecasting is carried out with the llowing operation: (a) the trajectory of moving particles of air to be drawn for period covered the computation; (b) the expected vertical movement of air for given part to be computed; id (c) the quantity of precipitation, which may be condensed, to be computed with triple graphs id nomograms. The weather maps and maps of baric topography also may be used for com-itation of precipitation. The degrees of justification for the forecasts in comparison with actual bserved precipitation, are tabulated for 9 months of 1955 and 3 months of 1956. The evaluation these data is discussed. *Subject Headings:* **1. Precipitation forecasting 2. Moscow, U.S.S.R.** *-N.P.S.*

12L–219 551.509.313:551.509.329:551.542

Kogan, S. Ia., **O reshenii nelineĭnoĭ zadachi, sviazannoĭ s kratkosrochnym prognozom polia avleniia.** [Solution of the nonlinear problem in short-range forecasting of the pressure field.] *kademiia Nauk SSSR, Institut Fiziki Atmosfery Trudy,* No. 2:177–186, **1958.** 2 figs., 3 tables, 8 eqs. **DLC** (Slavic)—The non-linear equation of Fridman is investigated for the vertical com-onent of absolute vorticity at the 500 mb surface. This equation is written approximately in ne form

$$\frac{\partial \Delta p}{\partial t} + \frac{1}{pl}\left(\frac{\partial p}{\partial x}\frac{\partial \Delta p}{\partial y} - \frac{\partial p}{\partial y}\frac{\partial \Delta p}{\partial x}\right) + \beta\frac{\partial p}{\partial x} = 0$$

he pressure p is replaced by the geopotential Φ and the zonal current is separated and the transition made from a system of x, y and t coordinates to a system of coordinates moving from west to east long the x axis with velocity $v = \frac{1}{\rho}\frac{d\Phi}{dy}$. The equation becomes

$$\frac{\partial \Delta\phi}{\partial t} + \frac{1}{2}\frac{\partial \phi}{\partial x} = \frac{1}{4\pi \sin\varphi}\left(\frac{\partial \phi}{\partial x}\frac{\partial \Delta\phi}{\partial y} - \frac{\partial \Phi}{\partial y}\frac{\partial \Delta\phi}{\partial x}\right)$$

nd its solution by successive approximations is carried out. The derivation of equations for fore-asting the pressure field is presented and their use is illustrated by means of specific examples. *ubject Headings:* **1. Short range forecasting 2. Pressure field forecasting.**—*I.L.D.*

12L–220 551.509.313

Liao, S. I., **Basic theory on numerical forecasting.** *Meteorological Bulletin,* Taipei, For-osa, 2(2):21–37, June **1956.** 7 figs., 30 refs., 163 eqs. In Chinese. **DLC** (Orientalia)—llustration of a number of numerical methods for predicting large scale motions in the atmosphere. careful study of the basic equations was made in regard to terms of numerical integration elating to dimensional and continuous two parameter models as well as advection and two layer nodels. Equations for quasi-geostrophic, barotropic vorticity, and quasi-Lagrangian system ere developed. In relation to the method for chart forecasting, the paper also included discus-ions on multiple-parameter models and stability properties of large-scale atmosphere disturbances. *ubject Headings:* **1. Numerical forecasting 2. Numerical analysis.**—*K.C.*

12L–221 551.509.313:551.542:551.43

Nozadze, R. I., **K voprosu ucheta vliianiia orografii pri prognoze atmosfernogo davleniia.** [Cal-ulation of the influence of orography in forecasting atmospheric pressure.] *Tiflis. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 4:38–53, **1959.** 4 figs., 9 refs., 51 eqs. **DWB**—A mathematical and theoretical paper in which the attempt is made fully to take into account he effect of orography upon variations of the atmospheric pressure field by means of a complex and nore accurate calculation of the distortion of geostrophic wind brought about by the uneveness of the arth's surface. The derivation of the fundamental forecasting equations from the equation of

thermodynamics in coordinates system x', y', p, t' and the solution of the fundamental forecas equation are presented. The final computation equation obtained for units of length of 500 k

$$\partial H/\partial t = 9.7\Sigma a_{ik}[0.16(H_1\Delta H)_{ik} + 0.24(H_z)_{ik} - 0.52(1.1 + 0.04\Delta H)(H,T)_{ik}] + \Sigma b_i[0.04(H,T)_{i0} + 0.17(H,n)_{i0}] \text{ decam/24 h}$$

where h is expressed in kilometers H gt in decameters $k = 1, 2, 3\cdots$ number of layers betv isobaric surfaces for which aerological data are available; a_ik. b_i weight coefficients computec cording to function M_{1i} and M_{2i} respectively. An actual calculation of the variation of surface p sure for Tbilisi for 12:00 o'clock Jan 27, 1956 and Jan 5, 1957 is presented. *Subject Head* **1. Pressure forecasting 2. Orographic effects 3. Tbilisi, Georgian S.S.R.**—*I.L.D.*

Statistical Methods (551.509.314)

12L–222 551.509.314:551.509.329:551.5

Ozawa, T.; Suzuki, E.; Taga, Y. et al., **On the statistical prediction of 500 mb contou the neighbourhood of Japan,** Pt. 1. *Journal of Meteorological Research,* Tokyo, 11(7): 587, July 1959. 9 figs., 2 tables, 3 refs., 8 eqs. In Japanese; English summary p. 581. **DC DLC**—We tried the daily forecasting of 500 mb contour in the neighborhood of Japan by multiple regression procedure with about $7 \sim 13$ variables. In order to improve such a statis method of forecasting, we scrutinized various statistical properties of the spatial vorticity and their advections in the vicinity of Japan, which were induced as the predictors in the sen empirical influence functions. *Subject Headings:* **1. Statistical cases for forecasting 2. tiple regression techniques 3. 500 mb prognostic charts.**—*Authors' abstract.*

12L–223 551.509.314:519.241.1:551.5

Pokrovskaia, T. V., **O primenenii metoda mnozhestvennoĭ korreliatsii k kachestven pravilam dolgosrochnykh prognozov pogody.** [Application of the multiple correlation m to qualitative rules in long-range weather forecasting.] *Leningrad. Glavnaia Geofizicheskaia servatoriia, Trudy,* No. 87:3–9, **1959.** 3 figs., 2 tables, 8 refs. **DLC**—World classicist weather forecasting methods, used not only the mean monthly air temperature or pressure the characteristics of atmosphere circulation (the number of cyclones and anticyclones and trajectories) but also the condition of the surface (icing in Arctic seas, temperature of the in the ocean and similar data) as initial data to make forecasts. This article uses exampl circulation data, and instead of computing coefficients of multiple correlation, correlation g of dependence on two variables are discussed. A number of historical cases of attempts at casting with their failures and successes are described. Terminology standards and norm mentioned. *Subject Headings:* **1. Long range forecasting 2. Forecast verifications.**—

12L–224 551.509.314:551.509.33:519

†Rao, K. N., **Longer range weather forecasting with special reference to the correl method.** (In: Pan Indian Ocean Science Congress, Aug. 1954, Perth, Western Australia, **ceedings of Section A, Physical Sciences,** (pub. 1958?). p. 3–13. tables, 44 refs., **DWB** (506.35 P187pr)—An analytical presentation is made of the long range forecasts that been conducted in India and the neighboring countries. Results obtained have been corr with figures from the South American countries and areas along similar latitudes. World w studies on seasonal forecasting, sunspot relationships and the distribution of rainfall have summarized. It is recognized that long range forecasting in India can be made with the statistical periodograms based on regression methods. *Subject Headings:* **1. Long range casting 2. Statistical forecasting 3. South America 4. India.**—*N.N.*

Upper Air Information as Applied to Forecasting (551.509.317)

See also: **Subtropical patterns,** 12L–184; **River runoff forecasting** (Drogaĭtsev), 12L–392; **Methods of weekly forecasts** (Similä), 12L–455; **Cyclone movement near the ground** (Romanova), 12L–627.

12L–225 551.5

Aujeszky, László, **A felsőbb légrétegek adatainak felhasználása a csapadék-progn kidolgozásában.** [Exploitation of upper-air data for preparing precipitation forecasts.] *lógiai Közlöny,* Budapest, 40(2):116–121, April 1960. 4 figs. German and English sum p. 120–121. **DWB**—Weather previsions, in general, are based on the synoptic method, uti the great wealth of observational data furnished currently by well established national and national meteorological networks. At the present stage of development, the core of this ext

bservational information is constituted by the results of regular radiosounding ascents, executed 1 6-hourly intervals, and distributed in a rather satisfactory way over the entire territory of urope, the number of which now amounts to several hundreds a day. The main method for btaining a comprehensive picture of the physical state of the atmosphere over extended geo- raphical regions involves the drawing of a series of charts representing the contour lines for t least the following isobaric surfaces: 1000, 850, 700, 500, 300 and 200 mb. Considering the pecial problem of preparing precipitation forecasts, contour charts for the 850, 700 and 500 millibar sobaric surfaces are of fundamental importance. For a typical weather situation as pictured by ne contour lines of the 850 and 700 millibar surfaces, the charts for Oct. 29, 1959, 12 G.M.T. re reproduced in figures. It has been found, that some of the most valuable synoptical con- iderations which have proved to yield rather satisfactory results in solving problems of current recipitation forecasting in this country, are the following: 1) a cyclonic curvature of the 700 mb ontour lines is to be regarded as a symptom greatly favourable for the aggravation of any pre- ipitation-forming processes existing in the region under consideration; 2) the large variations in ltitude to which the boundary layer between troposphere and stratosphere (the tropopause) is nown to be subjected, appear to possess a rather important connection with the degree of the everity of developing precipitation processes: the lower the tropopause is actually situated, the lore seriously such a process must be taken into consideration in preparing precipitation fore- asts. As an example of the rapid variations in the height of the tropopause, data from observa- ions executed at Budapest are given for the week of 23d to 29th Oct., 1959, in *Fig. 3*; 3) it is ecognized that, on the poleward side of tropospheric jet streams, a typical cause of which is ictured on *Fig. 4*, a distinctly greater amount of cloudiness and precipitations are to be expected enerally. *Subject Headings:* **1. Upper air data 2. Precipitation forecasting.**—*Author's bstract.*

12L–226 551.509.317

Cook Research Laboratories, Chic., Ill., **Geostrophic distance.** Contract AF 33(038)-23324, nterim Report, No. PR 17-5, June 7, **1952.** 8 p. 3 figs., table, 3 refs., 3 eqs. **DWB**—Scales hich vary with latitude are unnecessary if geostrophic distances are printed on base maps, such s the ones illustrated (for eastern U. S. and for North America, respectively). Tables and text xplain the concept and the methods of calculation and use. *Subject Headings:* **1. Geostrophic istance scales 2. Upper air analysis.**—*M.R.*

12L–227 551.509.317:551.507.352 551.501.7:551.506.7

Cook Research Laboratories, Chic., Ill., **Preliminary use of z_p/z, D, S/T.** Contract AF 3(038)–23324, Interim Report, No. 17-7, Aug. 20, **1952.** 30 p. 11 figs. (some fold.) 12 plates some fold.), 4 tables, 4 refs., eqs. **DWB**—It is recommended that observations from aircraft be ecorded in the same terms as the observations are made with aircraft meteorological or other in- truments, and that forecasts should be in the same terms as the recorded observations and nstrument readings in order that pilots or analysts can quickly check the forecast accuracy and nake corrections if necessary. The three parameters Z_p/Z, D and S/T are those suggested for se. Z_p is pressure altitude, Z height above mean sea level, D = altimeter correction, S = specific emperature anomaly and T = actual temperature in °C. Pastagrams (illustrated) are recom- nended to replace thermodynamic diagrams, pressure isolines in terms of D in synoptic charts sodees instead of absolute heights, and temperature in terms of S (isotans). Cross sections long 80th meridian from 5°S to 75°N up to 20 km height, summer and winter, show relative uerits of isotans over isotherms. Isotans indicate stability and airflow potential better than sotherms. *Subject Headings:* **1. Upper air analysis 2. Weather reconnaissance systems 3. Isodees 4. Isotans.**—*M.R.*

12L–228 551.509.317:517.9

Cook Research Laboratories, Chic., Ill., **Unitary differential notation** Contract AF 33(038)- 23324, Interim Report, No. PR-17-8, Jan. 27, 1953. 5 p. 2 figs., 4 refs. **DWB**—An effective nethod is being developed for quickly denoting "D" and "S" values and other upper air parame- ers which are observed continuously on reconnaissance flights. *Subject Headings:* **1. Unitary differential notation 2. Upper air analysis 3. Airplane weather reconnaissance systems.** —*M.R.*

12L–229 551.509.317:551.509.329:551.515.13(261)

George, J. J. (*Eastern Air Lines, Atlanta*); Wolff, P. M. and Somervell, W. L., Jr. (*both, Bur. of Aeronautics Project AROWA, U. S. Navy*), **An empirical method of forecasting 24-hour movement and change of intensity of sub-Arctic North Atlantic cyclones,** [Abstract only]. (In: Polar Atmosphere Symposium, Oslo, July 2–8, 1956, **Proceedings, Pt. 1, Mete-**

orology Section. N. Y., Pergamon Press, **1958.** p. 156.) Also issued in *Journal of Atm pheric and Terrestrial Physics,* London, Special Supplement, Pt. 1, **1957.** p. 156. **DWB, D** (QC994.8.P65)—A method is presented for objectively predicting the 24-hr movement and cha in intensity of North Atlantic cyclones. The technique developed requires only measurement of 500 mb height and temperature gradients above the current sea-level center, and determination the type of 500 mb flow in which the sea-level system is embedded. Although the results, w are empirical, speak for themselves, the success of the method is primarily attributed to pr classification of cyclones and to weak low-level baroclinity over the oceans, where the sea sur tends to create relatively uniform temperature gradients in the lower levels. That the 500 analysis alone should be sufficient to define the movement and intensification characteristics maritime cyclones is also ascribed to the following: 1) since the 500 mb height gradient is m ured at a point above the sea-level center, the strength of the 500 mb flow is equivalent to sea-level 500 mb thermal wind; 2) inasmuch as 500 mb temperatures are closely related to 300 mb mean temperature, 500 mb isotherms are an excellent approximation of the 500–300 thermal wind; and 3) since the geostrophic wind direction between 500 mb and the tropop seldom varies appreciably from that at 500 mb when the maximum wind in the layer is gre than 50 knots, the 500 mb contours adequately represent the direction of flow in the middle upper troposphere. In both the intensification and movement forecasts sea-level lows are cl fied as to type of 500 mb flow in which embedded and location therein, effectively classif individual lows as to stage of development. It has been verified that movement and chang intensity are closely related, for the most strongly deepening storms usually move rapidly filling storms as a rule move slowly. Due to the strong low-level baroclinity over contin large errors are more often encountered with storms originating over North America tha those over the North Atlantic, or even the more maritime western Europe. Nevertheless, method is useful over all three areas. The change of intensity forecast gives best results du the winter season, and is particularly useful in anticipating the explosive deepening which re in major ocean cyclones. Predictions of speed and direction of movement have also been t only during the winter months, October through March. *Subject Headings:* **1. Objective casting 2. North Atlantic cyclones 3. Ocean cyclones 4. North Atlantic Ocean.**—*Aut abstract.*

12L–230 551.509.317:551.509.324.2(5

†Golubov, R. S., **Ispol'zovanie dannykh zondirovaniia atmosfery pri sostavlenii prog dozhdei.** [Use of atmospheric sounding data for forecasting rain.] *Alma-Ata, Kazakh Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:3–24, **1959.** 11 8 tables, 32 refs. **DWB**—Vertical sounding data may be used to predict the amount of p within 20–24 hours if the front is less than 800 km away from Alma-Alta. Records are us show the recurrent weather features and the mathematical calculations used for their ana A succinct discussion on potential-convectional instability is included. A brief history o development of rain forecasting in this area is also given and reference is made to the wo A. Ø. Diobiok. German and English references are included. *Subject Headings:* **1. Rain casting 2. Atmospheric sounding data 3. Kazakh S.S.R.**—*E.Z.S.*

12L–231 551.509.317:551.571.72/3(5

Golubov, R. S., **Ispol'zovanie kart vlazhnosti pri sostavlenii prognozov.** [Use o midity charts in forecasting.] *Alma-Ata, Kazakhstan. Nauchno-Issledovatel'skiĭ Gidrome logicheskiĭ Institut, Trudy,* No. 10:25–30, **1959.** fig., 5 refs., 2 eqs. **DWB**—It is practic compute maps of the humidity and its change with altitude. Maps of such changes give quali characteristics of vertical motion. Specifically, change of humidity with altitude at 850–70 helps to determine which processes may be expected within the very near future whereas ch at 700–500 mb enable us to assume that changes will take place later. In the southeastern trict of Kazakhstan, during rainfall if descending movements occur, precip. will stop within hours, but in the cold area fog forms. Considerable sources of ascending and descending m in the frontal zone indicate the possibility of formation of cyclones in the zone of asce motion. *Subject Headings:* **Humidity charts 2. Upper air data 3. Cyclone forecastin Kazakh S.S.R.**—*E.Z.S.*

12L–232 551.5

§*Julian, Paul, **Preliminary monthly mean 50 mb and 100 mb charts, April–July,** *Pennsylvania. State Univ. Mineral Industries Experiment Station. Dept. of Meteorology,* tract AF 19(604)-2190, Scientific Report No. 1, July 31, **1959.** 43 p. 4 figs., 4 tables, 11 eq. (numerous figs. & tables in Appendix) **DWB**—Mean monthly constant pressure cha 100 and 50 mb and tabulated data, for the northern hemisphere for April–July, 1957. Th

were compiled for use in the IGY effort to develop a climatology of the stratosphere. The data were obtained from world-wide sources. The major emphasis in this paper is on the treatment of the data. Some of the difficulties in constructing constant pressure charts on a hemispheric basis at stratospheric levels are explained: viz., lack of data, radiosonde incompatibility, and instrument error. The tabulated data were subjected to four processes designed to improve the quantity and quality of the final monthly averages. *Subject Headings:* **1. Mean monthly pressure charts 2. Northern Hemisphere.**—*E.Z.S.*

12L–233 551.509.317:551.509.54.2:551.578.4

Kanazawa, Japan. Local Meteorological Observatory, **Work sheet for forecasting the snowfall amount in Ishikawa Prefecture, Pt. 1.** *Journal of Meteorological Research,* Tokyo, 11(8):681–698, Aug. **1959.** 18 figs., 3 tables, 3 refs., 2 eqs. In Japanese; English summary p. 681. **[Comments by]** *K. Inishi,* **[added coment by]** T. Kawamoto, *Ibid.,* 12(6):427–428, June **1960.** In Japanese. **DWB, DLC**—The authors studied the quantitative forecasting of snowfall in Ishikawa Prefecture, after Clarence D. Smith's method, and also analyzed precisely 850 mb chart. The results, which may be possibly used in routine work, are as follows: 1) During the period of NW monsoon, i.e., when snow falls more in mountainous areas than plains, the amount of snowfall generally depends on the Showalter's Stability Index, computed by the partial convergence after Bellamy's method; 2) when NW monsoon is weak, i.e., when snow falls heavily on plains and coastal area, the distribution of snow depth may be possibly estimated by the distribution of thermal vorticity and the rate of saturation. On the basis of both the precise analysis of 850 mb chart and the above-mentioned results, the snowfall area and depth may be forecast much more precisely than by usual methods. *Subject Headings:* **Snow forecasting 2. 850 mb chart analysis 3. Ishikawa, Japan.**—*Authors' abstract.*

12L–234 551.515.2:551.509.317(265):551.509:327

Kikuta, I., **[Comments on] Y. Neyama: Long-range forecast of typhoon by upper air data at Marcus Island and [Reply by] Neyama.** *Journal of Meteorological Research,* Tokyo, 11(11):957–958, **1959.** In Japanese. (For original, *see* 12.3–252, March 1961, *Met. Abs.*) **DWB, DLC**—Kikuta has commented that confusion exists in distinguishing between: 1) proximity and influence of typhoon, as far as seasonal differences are concerned; 2) the encroachment of typhoon, and the coming of warm-humid air mass, if the heavy rain followed by typhoon were to be analyzed in the general viewpoint instead of the viewpoint of orographic rain. Reply by Neyama states that the date of typhoon influence would differ from the passage, and it is possible to forecast a heavy rain both from objective and general viewpoints, because when the typhoon approaches towards the mainland it would bring a warm-humid air mass. *Subject Headings:* **1. Typhoon forecasting 2. Upper air data 3. Marcus Island.**—*K.C.*

12L–235 551.509.317:551.509.53

Klein, William H.; Lewis, Billy M.; Crockett, Curtis W. et al. (*all, U. S. W. B., Wash., D. C.*), **Application of numerical prognostic heights to surface temperature forecasts.** *Tellus,* Stockholm, 12(4):378–392, Nov. **1960.** 12 figs., 3 tables, 13 refs., 4 eqs. **DLC**—Multiple regression equations for predicting 5-day mean surface temperature in the U. S. from prior anomalies of 700 mb height and surface temperature are derived by a screening procedure for fall, winter, and spring. The heights required for an objective forecast are approximated with the aid of daily numerical prognoses prepared at the 500 mb level by a barotropic model and at the 700 mb level by a baroclinic model; the required temperatures are estimated by combining observed daily values with short-range prognoses. The resulting objective temperature predictions are verified on independent data at a number of cities, and the sources of error are analyzed. Comparison is made with forecasts prepared by local temperature persistence, continuity of error, and conventional methods. It is concluded that the objective method can produce in a short time, temperature predictions which have appreciable skill beyond persistence. Thus a valuable aid and base for further improvement has been made available to the forecaster. *Subject Headings:* **1. Surface temperature forecasts 2. Numerical prognosis 3. 5-day mean surface temperature forecasts. I. Enger, Isadore.**—*Authors' abstract.*

12L–236 551.509.317:551.542:551.552

Knox, Joseph B., **A physical basis for forecasting the pressure and horizontal wind fields in the lower stratosphere.** *Rand Corporation, Santa Monica, Calif., Paper 1108,* Aug. 29, **1957.** 13 p. 2 figs., 6 refs., eqs. **DWB** (M(o55) R186p)—The attempt to apply the principles of numerical prediction of the prognosis of the pressure field in the lower stratosphere made by G. Arnason (American Met. Soc. District of Columbia, **Proceedings of the Workshop on Stratospheric Analysis and Forecasting,** *see* 11C–4, March 1960, *Met. Abs.,* **1956**) is re-examined in

the framework of one parameter model. It is shown that a second level of non-divergence ex in the region of 100 to 50 millibars. In this stratospheric level of non-divergence the evolut of the absolute vorticity field is governed by the barotropic vorticity equation. This dyna equation may be used with some approximations to predict the evolution of the large scale press pattern. *Subject Headings:* **Upper air wind analysis 2. Pressure forecasting 3. Wind fi forecasting.**—*S. Nowinska.*

12L–237 551.509.317:551.50

Lecce, Biago and Del Trono, F., **Analogie nel comportamento del campo barico e term medio a 500 mb su alcune localita dei due emisferi e loro riferimento alla previsione a lu scadenza.** [Analogies between the behavior of the pressure and temperature field at the 500 level in certain regions of both hemispheres and their relation to long range forecasting.] *Geofi e Meteorologia,* Genoa, 7(3/4):63–66, May/Aug. **1959.** 4 figs., table, 3 refs. Italian and Eng summaries p. 66. **DWB**—From the study of the analogy between meteorological situations appears advisable to consider carefully the average baric trend of certain localities in orde evaluate the phenomena quantitatively, applying the concept of singularities of pressure and car waves at 500 mb. From the comparison of average baric diagrams of especially selected locati most likely it appears that there is a common agent which develops simultaneously over the hemispheres. *Subject Headings:* **1. Long range forecasting 2. Pressure singularities 3. mb level.**—*Authors' abstract.*

12L–238 . 551.509.317:551.5

Lenov, M. P., **O sinoptiko-aerologicheskom issledovanii atmosfernykh frontov.** [synoptic-aerological investigation of atmospheric fronts.] *Meteorologiia i Gidrologiia,* Lening No. 4:37–40, April **1957.** fig., eqs. **DWB, DLC**—A discussion of G. D. Zubian's **Sinopti aerologicheskom issledovanie atmosfernykh frontov. 1955.** (*see* 8.10–26, Oct. 1957, *Abs.*) The attempt to eliminate the break in the investigation of fronts aloft and frontal la and the break in the study of frontogenesis at the surface, and the significance of fronts in troposphere and stratosphere has not been accomplished successfully in this work. Various amples, itemized by chapter and page, illustrating the failure of the author are cited. *Sub Headings:* **1. Synoptic aerological studies 2. Frontal analysis.**—*I.L.D.*

12L–239 551.509.317:551.5

Liao, Shyue-yih, **The use of upper air thickness pattern in weather analysis and forec ing.** *Meteorological Bulletin,* Taipei, Formosa, 5(4):1–11, **1959.** 16 figs., 2 tables, 13 refs. eqs. In Chinese; English summary p. 1. **DWB, DLC**—Thickness pattern has become one the powerful tools in weather analysis and forecasting. Later, a novel element was introdu by Sutcliffe. He used dynamical conception on quantitative basis to the motion of the atm phere by the representation of the surface isobaric and the upper air thickness patterns. In report, the writer describes the dynamical properties of thickness patterns and its uses in wea analysis and forecasting. *Subject Headings:* **1. Weather forecasting 2. Upper air thick patterns.**—*Author's abstract.*

12L–240 551.509.317:551.

McClellan, D. E., **The grey cup weather: an analogue-dynamic experiment.** *Can Meteorological Branch, CIR-3036,* TEC-268, April 18, **1958.** 5 p. 10 figs. **DWB, DLC**— use of analogous sea level 500 mb, etc. charts in forecasting the weather situation (atmosph developments) 72 hrs in advance are discussed. As an illustration of his technique, he used specific example of the Grey Cup football play-off. This is a valid technique if the essential tures of both series are similar with trivial dissimilarities. *Subject Headings:* **1. Grey- weather forecasting experiment 2. 500 mb charts.**

12L–241 551.509.317:551.515

§Malkowski, G. (*Inst. of Met. & Geophysics, Freien Univ., Berlin*), **Zur Häufigkeit Druckgebilden in der 500 mb-Karte.** [Frequency of pressure formations on a 500 mb ch *Meteorologische Rundschau, Berlin,* 12(5):160–161, Sept./Oct. **1959.** 3 figs., table, ref. Ge summary p. 160. **DWB, DLC**—The 500 mb charts from 1953–1958 were studied to find whe there is a constant or near constant frequency of highs and lows from year to year. The maxi occurs in the summer months, and the minimum in the winter. The total number ranges 4586 to 5200. *Subject Headings:* **1. 500 mb charts 2. Pressure formation frequencies.**—*E.*

12L–242 551.509.317:551.509.52:551.5

Mertsalov, A. N., **O raschete uporiadochennykh vertikal'nykh dvizhenii vozdukha.** culation of stabilized vertical air movements.] *Moscow. Tsentral'nyĭ Institut Prognozov, Tr*

No. 83:3–6, 1959. fig., table, ref. **DWB**—The stabilized vertical air movements are computed daily for 56 points of Europe and adjacent areas of Siberia and Kazakhstan by the Division of Short Range Forecasts of the Central Institute of Forecasts (Ts.I.P.). The computations are carried out on current maps for time intervals from 3 p.m. to 3 a.m. of the next day. The results of the computation are regularly transmitted by radio. The method of computation is described with mathematical equations representing the diagnostic vertical movements. The prognostic vertical movements are computed for 34 points located in the European territory of U.S.S.R. on the maps of a future baric field near the ground surface and future field of 700 mb model for 03 o'clock of the following day. The computed values of the vertical air movements are tabulated and compared with actual ones at the level of 700 mb and 500 mb for the diagnosis and prognosis conditions. With special correction on changing baric field the information on vertical air movement can be useful. *Subject Headings:* **1. Vertical air movement calculations 2. Short range forecasting 3. European U.S.S.R. 4. Siberia U.S.S.R. 5. Kazakh S.S.R.**—*N.P.S.*

12L–243 551.509.317

Mertsalov, A. N., **Ob ispol'zovanii osrednennogo po prostranstvu polia H_{500} pri prognoze.** [Using of the space-averaged H_{500} field in forecasting.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 70:55–61, 1958. 2 figs., 5 tables, 2 refs., 3 eqs. **DWB, DLC**—Two methods are discussed in detail, and illustrated with graphs and tables. The first method concerns the local changes in absolute geopotential at any isobaric surface. The technique of preparation of future charts of 500 mb by transfer of the geopotential field along isoline (B) and (B^1), is described with corrections on deflecting forces of the rotation of the earth and for different geographic latitudes. The second method concerns the transfer of daily isallohypse (H_{500}) on the same isolines. Both methods do not consider the evolution of the isallobaric regions, and therefore, the utilization of the field of function (B) is suggested and described in addition to the synoptic method of preparation of future charts of 500 mb. The deviations between computed data with future, near the ground charts and actual value of the (H_{500}) are tabulated for various periods. *Subject Headings:* **1. Geopotential field forecasting 2. 500 mb charts.**—*N.P.S.*

12L–244 551.509.317:551.515.81

§Nyberg, A. and Palmén, E., **Synoptisch-aerologische Bearbeitung der Internationalen Registrierballonaufstiege in Europa in der Zeit 17.–19. Oktober 1935.** [Synoptic-aerological analysis of the international balloon-meteorograph ascents in Europe during Oct. 17–19, 1935 with a foreword and 6 synoptic charts by T. Bergeron.] (In: **Festskrift tillägnad Vilhelm Bjerknes, den 14 Mars 1942.** Stockholm, Centraltsyckeriet, 1942. p. 79–121. 26 figs., 4 tables, foot-refs., eqs.) **DWB**—A typical Palmén analysis begun by J. Bjerknes & T. Bergeron of an unusual occlusion which occurred over NW Europe during the period Oct. 17–19, 1935 when swarm ascents were made at Norwegian Nesbye and Swedish Filipstad station near the 60° parallel N. The 12-hourly analyzed charts for Oct. 17, 18, and 19 are presented and discussed and the aerological data analyzed and presented by extensive tables and adiabatic graphs. Corrections are analyzed, and time cross-sections and tropopause, 700, 500 and 300 mb charts are also presented. *Subject Headings:* **1. Synoptic aerological analysis 2. Occlusion, N.W. Europe (Oct. 17–19, 1935) 3. International serial aerological ascents. I. Bergeron, T.**—*M.R.*

12L–245 551.509.317:551.515.727(98)

Pchelko, I. G., **Ob obrazonvaii i evoliutsii letnego stratosfernogo antitsiklona v severnom polusharii.** [The formation and evolution of a summer stratospheric anticyclone in the Northern Hemisphere.] *Meteorologiia i Gidrologiia,* No. 12:3–10, Dec. **1959.** 5 figs., 4 refs. **DWB, DLC**—The scientific study of circulation in the stratosphere, carried out according to the program of the IGY is described in detail. Special attention is given to the study of the evolution of the polar stratospheric anticyclone in connection with evolution of the baric field from the moderate latitude to the whole northern hemisphere. The analyses of daily maps 30 mb from April to Sept. 1958 and from April to July, 1959 are included. The analyses also cover the series of maps 25 mb made from numerical bulletins of the USA Weather Bureau. The method of analysis is described in detail and the results plotted on 4 maps are discussed. The changes in the altitudes of the surfaces for 30 and 25 mc above the North Pole are illustrated by the set of curves for periods of 1957–1959, which indicate that the structure of the baric field at high altitudes observed at the same season may be different from year to year. *Subject Headings:* **1. International Geophysical Year, 1957–1958 2. Polar stratospheric anticyclones 3. Summer stratospheric anticyclones 4. North Pole region 5. Northern Hemisphere.**—*N.P.S.*

12L–246 551.509.317:551.547

Piatygina, K. V., **Formuly dlia predvychisleniia peremeshcheniĭ vysotnykh baricheskikh tsentrov.** [Formulas for predicting the displacement of pressure centers aloft.] *Leningrad.*

Glavnaia Geofizicheskaia Observatoriia, Trudy, No. 81:64–72, **1959.** 2 figs., 3 tables, 3 refs., 20
DLC—The forecasting of the displacement pressure centers for the 500 and 700 mb surfaces is car
out in a manner analogous to that developed by M. I. IUDIN for forecasting pressure centers at
surface of the earth (*A. N. SSSR* 112 (1), **1957**). In formulas for the components of the velocit
displacement of pressure centers,

$$C_x = l^2 \frac{u' \frac{\partial^2\phi}{\partial y^2} - v' \frac{\partial^2\phi}{\partial x \partial y}}{\frac{\partial^2\phi}{\partial x^2}\frac{\partial^2\phi}{\partial y^2} - \left(\frac{\partial^2\phi}{\partial x \partial y}\right)^2}; \quad C_y = l^2 \frac{v' \frac{\partial^2\phi}{\partial x^2} - u' \frac{\partial^2\phi}{\partial x \partial y}}{\frac{\partial^2\phi}{\partial x^2}\frac{\partial^2\phi}{\partial y^2} - \left(\frac{\partial^2\phi}{\partial x \partial y}\right)^2}$$

it is necessary to set up the derivatives of the geopotential and the constituent deviations of the v
from the geostrophic (u' and v') at the levels considered. In these formulas l = Coriolis parame
ϕ = geopotential and x, y = horizontal coordinates. The derivation of the equations for deter
ing u' and v' for the 700 and 500 mb surfaces and for calculating the deviation of the wind from
geostrophic are presented and the method of computing numerically the displacement of pres
centers is outlined. *Subject Headings:* **1. Forecasting formulas 2. Forecasting displacemen
pressure centers.**—*I.L.D.*

12L–247 551.509

*Rafailova, Kh. Kh., **Primenenie ezhednevnykh kart anomaliĭ OT 500–1000 k prognc
na tri dnia.** [Use of daily charts of 500–1000 mb thickness anomaly in forecasting for t
days.] *Moscow. Tsentral-nyĭ Institut Prognozov, Trudy*, No. 64:111–154, **1958.** 13 figs.
tables, 15 refs., 8 eqs. **DLC**—An attempt is made to develop a method of forecasting syn
processes independently of the limits of natural synoptic periods and elementary synoptic
esses. The principle elements of the method are as follows: 1) anticyclogenesis at the ea
surface and the ingress of an eastern frontal zone, which is oriented meridionally as a ridge
is observed only when the earth of convergence coincides with the area of zero anomalies on
500/1000 mb anomaly chart and when the horizontal temperature gradient is directed from
to east; and 2) the anomaly field 500/1000 mb characteristic of the anticyclogenesis forms ea
than the anticyclogenesis itself. The contents of this study comprise the following, viz
analysis of the characteristics of daily anomaly charts of 500/1000 mb; the conditions inv
in the formation of pressure configurations at the surface of the earth in connection with
properties and evolutions of 500/1000 mb anomaly field; formation of pressure configuratio
zones of convergence and divergence of high altitude atmospheric flow as a function of 500/
mb anomaly field; evolution of pressure configurations at the surface of the earth in conne
with the characteristics of the 500–1000 mb anomaly field; direction of displacement of pre
configurations at the surface of the earth from the point of view of the condition and var
of the 500/1000 mb anomaly field; conditions of formation of pressure configurations at the
mb surface in connection with the character and evolution of the 500/1000 mb anomaly
evolution and direction of displacement of pressure configurations aloft; evolution of the
1000 mb anomaly field and practical use of the daily 500/1000 anomaly charts in making
forecasts of the development of synoptic processes. *Subject Headings:* **1. 3-day forecast
Daily anomaly charts.**—*I.L.D.*

12L–248 551.509.317:551

Reed, Richard J., **A baroclinic graphical prediction model.** (In: McGill Univ. Arctic Me
ology Research Group, **Contributions to the study of the Arctic circulation.** Contract AF 19(
1141, Scientific Report No. 7, March **1958.** p. 69–76. 2 figs., 2 refs., 2 eqs.) **DWB**—The prin
of graphical prediction are presented without entering into mathematical detail, but empha
placed upon physical principles and methods of application. The method of graphic predict
designed to yield surface or 1000 mb forecasts and is based upon a baroclinic model. The prepa
of the 500 mb or barotropic forecast is described. This involves a consideration of the conserva
absolute vorticity, $Z_5 - Z_3 + G$ = a constant, from which the 500 mb forecast is made. I
surface forecast the conservative quantity is $\bar{Z}_0 - Z_0 + Z_T/2$ = a constant. By the solution
equation, the elimination of the 500 mb changes and the addition of the 1000 mb height chan
the initial height gives the prognostic chart. An appendix gives a rather thorough discussion
method. *Subject Headings:* **1. Baroclinic models 2. Graphical forecasting models 3. 5C
charts 4. 1000 mb charts.**—*I.L.D.*

12L–249 551.5

Shafer, R. J., **Technique for predicting the 24-hour prognostic surface chart.**
Visscher, H. B. et al., **Development of practical, short-range, weather prediction techn
Atlanta, Georgia, Eastern Air Lines, Dec. **1955.** p. 17–34. 13 figs., table.) **DWB**

12L3d)—A technique is developed to aid in drawing prognostic charts, particularly under conditions when there is no strong system susceptible to treatment under previous objective techniques. The method involves prediction, first, of the 700 mb prognostic chart and second, the 850 mb thermal pattern. Using these, a surface chart is developed. Charts show pressure change correlation; amplitude and half-wave length; zonal flow; 500 mb height change, Stage I, 700 mb East movement, Stage II, 700 mb East movement, and Stage III, a computation graph for computing zonal and meridional components of the flow. In addition to a sample work sheet, progroses charts for three days in Jan. 1955 are included. *Subject Headings:* **1. Short range forecasting 2. Prognostic charts 3. Upper air data.**—*E.Z.S.*

12L–250 551.509.317:551.509.327:551.515.23

Shibayama, T., **Forecasting the movement of typhoon by 500–1000 mb thickness chart.** *Journal of Meteorological Research,* Tokyo, 12(8):509–517, Aug. **1960.** 7 figs., 7 refs., 7 eqs. [In Japanese; English summary p. 509. **DWB, DLC**—On the assumption that a typhoon moves towards the area of maximum convergence in the lower level, the author tried to forecast the direction of typhoon movement by 500–1000 mb thickness chart based on Sutcliffe's approximate equation of divergence. For the practical use of forecasting, the author represented the direction of typhoon movement according to the thickness pattern and the position of typhoon center. *Subject Headings:* **1. Typhoon trajectory forecasting 2. 500–1000 mb thickness chart.**—*Author's abstract.*

12L–251 551.509.317:551.509.327:551.515.23

Tung, K. C. (*Inst. of Met., Central Weather Bureau, Peking*), **Preliminary analysis of the 500 mb mean field and the prediction of typhoon tracks.** *Science Record,* Peking, 2(2): 463–465, **1958.** 4 figs. **DLC** (Orientalia)—The author has analyzed the mean geostrophic wind field at 700, 500 and 300 mb above the center of typhoon. It was found that the mean field at 500 mb and the typhoon track are very near to each other but there is no obvious relationship between the intensity of the typhoon and the position of the steering level. Additional details on the path of the deepening, the accelerating speed and stagnant typhoon are outlined. It is simple in short range forecasting of typhoon tracks to consider the mean geostrophic wind field of 500 mb as the steering current and to refer carefully to the other facts which affect the movement of typhoons. *Subject Headings:* **1. Typhoon track forecasting 2. 500 mb level.**—*K.C.*

12L–252 551.515.8:551.509.317

Switzerland. Meteorologische Zentralanstalt. **Wetterlagen und Fronten im Jahr 1957.** [Weather conditions and fronts in 1957.] Its *Annalen,* Vol. 94, 1957, publ. 1958. Anhang No. 7. 3 p. tables. **DWB**—Daily tables are given for the direction gradient of the level pressure, the direction and speed of the geostrophic wind at 500 mb, the thickness of the 500–1000 mb layer, the frontal passages and types of air-masses in the centre of the Alps. *Subject Headings:* **1. Air masses and fronts 2. Upper air data 3. Switzerland.**—*A.V.*

12L–253 551.509.317:551.547.5

Uspenskiĭ, B. D., **Metod opredeleniia evoliutsii vysot izobaricheskikh poverkhnosteĭ.** [Method of determining the development of the heights of isobaric surfaces.] *Meteorologiia i Gidrologiia,* Leningrad, No. 8:3–7, Aug. **1959.** 5 refs., 19 eqs. **DWB, DLC**—The author develops a method of approximately forecasting the evolution of the heights of isobaric surfaces by generalizing earlier results (*Met. i Gid.*, No. 2, **1958**, B. D. Uspenskiĭ, **Method of determining local acceleration and geopotential variations**). Formulas are devised by means of which the forecasts of the sign of evolution of high altitude pressure centers have an increased reliability. The formulas are as follows, viz:

$$\partial H_B = \left(\frac{dH}{dt}\right)_{t=0}^{t} + \tfrac{1}{2}\left(\frac{d^2H}{dt^2}\right)_{t=0}^{t^2}, \qquad \frac{dH_B}{dt} = 0.1\Sigma c_\tau$$

$$\frac{d^2H}{dt^2} = [-8.0\overline{\Delta H} + 1.5\Sigma c_\tau] + 0.1\left[\frac{\partial^2\bar{H}}{\partial x^2}\frac{\partial^2\bar{H}}{\partial y^2} - 3.0\left(\frac{\partial^2\bar{H}}{\partial x \partial y}\right)^2\right]$$

and

$$\frac{\partial^2H}{\partial t^2} = [-14.0\overline{\Delta H} + 1.5\Sigma c_\tau] + 0.3\left[\frac{\partial^2\bar{H}}{\partial x^2}\frac{\partial^2\bar{H}}{\partial y^2} - \left(\frac{\partial^2\bar{H}}{\partial x \partial y}\right)^2\right]$$

(where H = absolute geopotential, t = time, c_τ = radial and tangential components of a wind vector, $\overline{\Delta H}$ = averaged for the areas of the magnitude of the Laplacian from H). *Subject Headings:* **1. Forecasting formulas 2. Isobaric surface heights.**—*I.L.D.*

12L–254 551.511:551.509

Watanabe, T., **On the entropy of anomaly types of five-day mean 700-mb height over the East.** *Journal of Meteorological Research*, Tokyo, 8(7):450–451, Aug. 1956. table, 2 refs., In Japanese. **DWB, DLC**—On the basis of the chart reported in this Journal, vol. 7(4) pp. 238– this paper presents the results of the probability of occurrence and the frequency of deviation being studied on the basis of entropy. If the probability of occurrence on a-type is expressed by

$$P(a) = \frac{23}{97}, \qquad \text{Entropy } H_1 = -\left[P(a)\log_2 P(a) + P(b)\log_2 P(b) + \cdots P(p)\log_2 P(p)\right]$$

$$= -\left[\frac{23}{97}\log_2\frac{23}{97} + \frac{21}{97}\log_2\frac{21}{97} + \cdots\right]$$

$$= -\frac{1}{97}\times\frac{1}{\log_2}[23\log 23 + 21\log 21 + \cdots - 97\log 97] \doteqdot 2.3609$$

then, all 16 types are equal at random

$$H_0 = \log_2 16 = 4 \text{ bits}$$

thereon, the redundancy $= 1 - \frac{H_1}{H_0} = 0.4098$. But Entropy H_2 in consideration of persistency

$$H_2 = 2.1499 \text{ bits},$$

Accordingly, redundancy $= 1 - \frac{H_2}{H_0} = 0.4625$. *Subject Headings:* **1. 1.5-day anomaly types 2. height anomalies.**—*K.C.*

12L–255 551.509.317:551.515.8(2

Whiting, R. M. and Biggers, W. R., **Appalachian line squalls.** (In:Visscher, H. B. e **Development of practical, short-range, weather prediction techniques.** Atlanta, Geo Eastern Air Lines, Dec. 1955. p. 35–50. 9 figs.) **DWB** (M09 E13d)—A method is desc for predicting line squalls which form along the Appalachian Mountains during the summer- It involves the location of surface fronts and the microstructure of the 500 mb chart. Ther three basic categories of surface patterns used in this study. The first includes synoptic s tions unfavorable for the line squall development, and in the second, there are four basic pat in which the development of line squalls are independent of frontal influences or in which the negligible. The third category involves synoptic situations in which pre-frontal conver affects the Appalachian Mountain Area. In addition to the work sheet appended, categories 3 are abundantly illustrated. *Subject Headings:* **1. Squall line forecasting 2. Synoptic ditions for squall formation 3. Appalachian Mountains.**—*E.Z.S.*

12L–256 551.509.317:551.5

Zverev, N. I., **Prognoz sredneĭ semidnevnoĭ karty at 500.** [Forecasting the mean 7-day 50 chart.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, No. 85, 1959. p. 27–39 5 figs., 5 t 7 refs. 14 eqs. **DWB**—An attempt is made to develop a statistical method of forecasting the 7 day AT_{500} chart. This method is based upon the hypothesis that the development of sy processes in the future is fully and uniquely determined by the history of synoptic processes ov region selected (region bounded by 15° west long., 75° east long. and 40–70° north lat.). hypothesis was verified with the aid of daily AT_{500} anomaly maps from 1949 to 1957. The indi circulation (developed by H. A. Bagrov) capable of describing cyclonic and anticyclonic pro in any part of the northern hemisphere, were used as objective indices of macrosynoptic proc These objective indices are taken as the value of coefficients of resolution of the meteorologica $Z(xy)$ according to orthogonal Chebyshev polynomials, namely $Z(xy) = A_{00} + A_{10}\psi_1(x)$ $+ A_{01}\psi_0(x)\psi_1(y) + A_{ks}\psi_k(x)\psi_s(y)$ where A_{ks} coefficient of resolution according to Chebyshev o onal polynomials termed indices, $\psi_k(x)$ = Chebyshev polynomial of the order k of the varia $\psi_s(y)$ = polynomial of the order s of the variable y. The value for A_{ks} is given by

$$A_{ks} = \frac{\sum_{\lambda=1}^{n}\sum_{m=1}^{m} Z(x_n,y_m)\psi_k(x_n)\psi_s(y_m)}{\sum_{n=1}^{n}[\psi_k(x_n)]^2 \sum_{m=1}^{m}[\psi_s(y_m)]^2}$$

Actual attempts of analysis of fields of daily anomalies of AT_{500} by means of orthogonal Cheb polynomials, the programming of the "Pogoda" computer to calculate A_{ks}, the weight of each indices in the analysis of AT_{500} anomaly charts and the stability of the circulation indices wit

are discussed. The forecast of the 7-day AT_{500} map involved the analysis of history of preceding synoptic processes over a week period. The forecast of 7-day anomalies of AT_{500} was reduced to forecasting 8 indices. Each index was forecast by proceeding from an analysis of its history, in other words the forecast of a large scale movement was similarly determined by its dynamics during the preceding six weeks. The equations for the dynamics of an index and for the determination of the index are presented and the application and verification of the forecast procedures are discussed. *Subject Headings:* **1. 500 mb charts 2. Statistical forecasting 3. Forecast evaluations.**—*I.L.D.*

Types of Atmospheric Circulation on a Large Scale (551.509.318)

See also: **Tornado-producing synoptic patterns** (Miller), 12L–384; **Forecast of air temperature for synoptic period** (Ped, Al'tvergu), 12L–449; **Preparing monthly forecasts** (Shishkov), 12L–454; **Seasons and rhythmicity** (Duletova), 12L–475; **Atmospheric temperature anomalies** (Nikitina), 12L–536.

12L–257 551.509.318

Baĭdal, M. Kh., **Povtoriaemost' estestvennykh sinopticheskikh periodov s zapadno-vostochnoĭ tsirkuliatsieĭ.** [Recurrence of natural synoptic periods with a west-east circulation.] *Alma-Ata, Kazakhstan Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 6: 48–55, 1956. 3 figs., table, 8 refs. **DWB**—The basis for long-term forecasting of weather is the rhythmic activity in the atmosphere. To facilitate forecasting when scarcity of basic data exist, the results of investigations in reference to the recurrence of the processes of west-east circulation (latitudinal) in the atmosphere from Jan. 1953 to July, 1955 are presented. All natural synoptic periods on which the latitudinal circulation over the area from the east coast of North America to the west shores of the Pacific had no influence. The analysis is illustrated with three sketches of the types of latitudinal circulation, a table of recurrence of analogous and non-analogous synoptical processes and the sketches indicating the dynamics of near the ground atmosphere pressure centers. *Subject Headings:* **1. Long range forecasting 2. Large scale circulation 3. West-east circulation.**—*B.J.G.*

12L–258 551.509.318:551.515.127:551.515.727

§Duletova, R. A. and Grebeniuk, E. V., **Karty razmeshcheniia vysokikh kholodnykh tsiklonov i vysokikh tepleykh antitsikonov v kontse estestvennogo sinopticheskogo perioda.** [Charts of the distribution of high-level cold cyclones and high-level warm anticyclones at the end of a natural synoptic period.] *Alma-Ata, Kazakhstan, Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:82–87, 1959. 3 figs., 5 refs. **DWB**—The charts which were developed by V. P. Mul'tanovskiĭ and presented in this study show that the processes over the eastern Atlantic, Europe and Western Siberia differ from those developed over the southern half of North America, eastern Siberia and the Western parts of the Atlantic and Pacific. According to Mul'tanovskiĭ the natural synoptic period takes places in such a way that the period ends with a system of high, cyclones and anticyclones and these may be used in prognoses of future developments. *Subject Headings:* **1. Natural synoptic periods 2. Prognostic charts.**—*E.Z.S.*

12L–259 511.509.318:625.712(436.14)

Fischer, P. Leander, **Der winterliche Strassenzustand 1958/59 in Wien I, Schottengasse und Helferstorferstrasse.** [The winter street conditions 1958/1959 in Vienna I, Schottengasse and Helferstorferstrasse.] *Wetter und Leben,* Vienna, 11(8/10):139–142, 1959. table, 3 refs. **DWB**—Details of weather conditions 1958/59 are given and compared with the characteristics of six previous winters. *Subject Headings:* **1. Winter weather types 2. Austria.**

12L–260 551.509.318

§Green, Raymond A. (*U. S. Weather Bureau, Wash., D. C.*), **The weather and circulation of December 1958.** *Monthly Weather Review,* Wash., D. C., 86(12):487–492, Dec. 1958. 6 figs., 4 refs. **DWB, DLC**—Waves of large amplitude characterized the mean circulation at middle latitudes of the Western Hemisphere while fast westerlies in waves of small amplitude dominated the Eastern Hemisphere at similar latitudes. Deep mean troughs extending from the Aleutians to Hawaii and from the Maritime Provinces to the Gulf of Mexico were separated by a strong ridge over Western North America. The distribution, direction and magnitude of the changes of the temperature anomaly pattern, with warming to the west and cooling to the east of the Continental Divide are described. Changes between half months are also described. Precipitation exceeded normal in four general areas with greatest departures over the Pacific Northwest and the northern Divide. *Subject Headings:* **1. Synoptic conditions for weather, Dec. 1958. 2. Northern Hemisphere.**—*E.Z.S.*

12L–261 551.509.318:551.513.2:551.524

§Gromova, G. G., **Osobennosti tsirkuliatsii v Marte 1957 g.** [Peculiarities of the circula of March 1957.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 71:114–120, 19 3 figs., 4 refs., 3 eqs. **DLC**—In March 1957 unstable and cold weather prevailed over most the U.S.S.R. The mean monthly temperature was below normal. A negative anomaly of m monthly temperature also characterized the Middle East, the Balkan Peninsula, southern It Baffin Land, southern Greenland, Florida and western North America. A positive tempera prevailed over the North Atlantic Ocean in most areas of the northern half of the Pacific Oc and North America. This anomaly is explained by the fact that the atmospheric circulation characterized by marked troughs aloft over the Atlantic Ocean, eastern Europe, Kamchatka Pe sula and northeast North America and by ridges aloft over the western Atlantic Ocean, wes Europe, eastern Siberia and western North America. The mean monthly map AT_{500} and pattern of synoptic processes in March 1957 is presented and the relationship of the general culation to the temperature anomaly and the natural synoptic periods of this month are discu with the aid of synoptic charts. *Subject Headings:* **1. Circulation patterns of Northern He sphere March 1957 2. Negative temperature anomaly 3. Northern Hemisphere.**—*I.*

12L–262 551.509.318:551.509

House, Donald C. (*U. S. W. B.*), **Basis for the prediction of severe local thunderstor** *Institute of the Aeronautical Sciences, IAS Paper,* No. 60-2, **1960.** 13 p. 8 figs., 5 refs. D (M:629.13 I59pa)—The most satisfactory techniques in use today for the prediction of se thunderstorms revolve around the solution of the atmospheric processes that control the tren stability which involves two steps: 1) the detection of or the prediction of stability and 2) stability trend, and the detection of or prediction of the mechanism that will release the instal locally. Since the prediction of the stability trend is so intimately related to the developme cyclones, the prediction of the gross synoptic features associated with severe local storms is b upon the physical processes connected therewith. The prediction of the mechanism that rel the instability locally is believed to result from horizontal accelerations and nonhydrostatic ditions. The localization of a severe weather threat is then dependent upon the forecaster's a to detect or predict the existence of these conditions. The prediction procedure is illustrated b synoptic situation of May 20, 1957. *Subject Headings:* **1. Thunderstorm forecasting 2. I synoptic studies 3. Stability forecasting.**—*Author's abstract.*

12L–263 551.509.33:551.509.318:551.509.

§Imada, M., **On a method of one week forecasting of heavy rain by means of the br scale upper air charts over the Northern Hemisphere.** *Journal of Meteorological Rese* Tokyo, 10(11):935–942, Nov. **1958.** 11 figs., 7 tables, 14 refs., eqs. In Japanese. **DWB,** —During the rainfall of 1957 at Hiroshima, higher rainfall amounts were found when broad mean upper air charts of the Northern Hemisphere were examined and analyzed on the bas mean deviation and by using 5-day mean 500 mb charts. A detailed study was made o variation of 3-day mean zonal index at 700 mb in reference to "Bai-u," on the mean perio of the trough at 700 mb, using the method of correction by harmonic analysis. *Subject Head* **1. Synoptic analysis 2. Heavy rainfall forecasting 3. 500 mb charts 4. Zonal inde Northern Hemisphere.**—*K.C.*

12L–264 551.509.318:551.524.3

*Isaev, E. A., **Issledovanie sinopticheskikh protsessov, privodiashchikh k rezk ponizheniiu temperatury na Evropeĭskoĭ territorii SSSR.** [Investigation of synoptic pro leading to a sudden temperature drop in European U.S.S.R.] *Moscow. Tsentral'nyĭ In Prognozov, Trudy,* No. 51:44–82, **1957.** 14 figs., 11 tables, 5 refs. **DLC**—The general "cold wave," used in long range forecasting, is described. Four tables of rapid temperature observed at 10 localities from January to March are shown. Three types of anticyclonic f tions are included in the analysis: ultra-polar, meridional and normal. Analysis of the sy processes lead to the conclusion that basically all processes that occurred between Oct. and and between Feb. and June "rhythmically" are similar to those which occurred in Jan. Sim of these processes in different months are illustrated diagrammatically on 18 maps. The prob of repetition of temperature within definite limits of processes of different types are disc using the tabulated data and a set of isotherms on 10 maps indicating the distribution of a temperatures from Jan. to May between 1898 and 1933. In conclusion the rhythmicity o synoptic processes and monthly cyclic repetition are confirmed by this analysis. *Subject Hea* **1. Synoptic conditions for temperature drops 2. European U.S.S.R.**—*N.P.S.*

12L–265 551.509.318:5

§Klein, William H. (*Extended Forecast Section, U. S. W. B.*), **The circulation and w of 1957.** *Weatherwise,* Boston, 11(1):7–11, Feb. **1958.** 8 figs. **DWB**—Low index dom

the western half of the Northern Hemisphere as shown by the zonal index curve for the year. Seasonal anomalies are discussed and illustrated by charts. *Subject Headings:* **1. Circulation of 1957 2. Weather of 1957 3. Northern Hemisphere.**—*M.R.*

12L–266 551.509.318:551.524.36(7)

§Klein, William H. (*Extended Forecast Sec., U. S. W. B., Wash., D.C.*), **The weather and circulation of February 1958: a month with an expanded circumpolar vortex of record intensity.** *Monthly Weather Review,* Wash., D. C., 86(2):60–70, Feb. **1958.** 10 figs., table, 11 refs. **DWB, DLC**—Record cold in southeast and warm in northwestern states, snow in Gulf and Atlantic states and precipitation in the Great Plains, and low barometer in Central U.S.A., was noted in Feb. 1958. Low index, with deepest mean troughs were recorded along east coast and in Eastern Pacific-southward displacement of mid-latitude westerlies (jet) to sub-tropics (from 45° to 30°) where they were excessively strong. Cross sections and time sections, charts and text reveal the magnitude and details of the anomalies. The last week showed a complete reversal of pattern of temperature anomaly (change from warm in west and cold in east to cold in west and southwest and warm in east and north of U.S.A.). *Subject Headings:* **1. Abnormal February weather, U. S. (1958) 2. Cold winters 3. United States.**—*M.R.*

12L–267 551.509.318:551.515.8(938)

†Kopcewicz, Teodor, **O. Wielkościach niezmienniczych w atmosferze i ich znaczeniu dlia meteorologii synoptycznej.** [On the conservative properties of the atmosphere and their value in synoptic meteorology.] *Poland. Państwowy Instytut Hydrologiczno-Meteorologiczny, Wiadomości Służby Hydrologicznej i Meteorologicznej,* 1(3):179–212, **1948.** 8 figs., 13 tables, 20 refs., 29 eqs. French summary p. 5. **DWB**—A theoretical paper on the theory and techniques of soundings of the atmosphere (especially by means of a Bureau radiosonde, modified by the author) as well as of the thermodynamics of the atmosphere and the methods of applying the results for meteorological and forecasting purposes. After giving a critical review of the existing methods of sounding the upper layers of the atmosphere and discussing the exactness of their results, the author establishes some values (potential temperature, equivalent-potential and potential temperature of wet bulb thermometer) which are invariable in regard to adiabatic changes of atmospheric air, he presents a method of calculating them with the aid of special tables. A generalization is presented by defining adiabatic and pseudoadiabatic processes in the atmosphere, by introducing the general value of the invariable θ ps (according to G. Strüve) of the process. On the basis of data from his own sounding experiments during 1938–1939, the results of calculation of mean values of equivalent potential and potential temperatures (wet bulb thermometer) of two air masses (arctic and tropical) over Poland are given which are in perfect accord with the results of Schinge measurements for Central Europe. *Subject Headings:* **1. Air masses 2. Synoptic meteorology 3. Poland**—*A.M.P.*

12L–268 551.509.318:681.14

Krumbein, W. C. (*Dept. Geology, Northwestern U. Evanston, Ill.*), **Trend surface analysis of contour-type maps with irregular control-point spacing.** *Journal of Geophysical Research,* Wash., D. C., 64(7):823–834, July **1959.** 4 figs., 2 tables, 12 refs., 12 eqs. **DLC**—Trend surface analysis is a procedure for separating the relatively large-scale systematic changes in mapped data from essentially non-systematic small-scale variations due to local effects. The method can be applied to any contour-type map, and has been used for analysis of gravity maps, isotach maps, facies maps, and maps of igneous and sedimentary rock attributes. When observations can be collected on a rectangular grid, orthogonal polynomial analysis permits convenient separation of the trend from the residuals. When observations are limited in number or are irregularly distributed over the map, non-orthogonal polynomial analysis can be used to determine at least the linear and quadratic components of the trend. These surfaces and deviations from them have value in geological interpretation and they suggest that even when the complete trend is known, maps of selected trend components may be useful for examining special problems. Polynomial analysis of maps is facilitated by use of high speed computers. Organization of an IBM 650 program is outlined in this paper. *Subject Headings:* **1. Trend surface analysis 2. Synoptic analysis.**—*Author's abstract.*

12L–269 551.509.318:551.515(46)

§Lines Escardo, Alberto, **Notas acerca de los temporales que afectaron a Espãna durante el primer trimestre de 1957.** [Storms in Spain, Jan.–March 1957.] *Revista de Geofísica,* Madrid, 17(65):105–118, Jan./March **1958.** 13 figs. **DWB**—General characteristics of the weather during the first three months of the year are described and weather charts included. Six storms are discussed. Four of the storms were clearly Atlantic, one came from the north having

formed back of the cold front, and one owed its formation to the cold front. The 500 mb ch
for each storm is included. *Subject Headings:* **1. 500 mb charts 2. Storm surveys 3. Spa**
—E.Z.S.

12L–270 551.509.318:551.54

*Maede, Hans, **Über den Zusammenhang zwischen den Grosswetterlagen und eini**
Kenngrössen der 500-mb-Fläche über Mitteleuropa. [Relation between large-scale weat
situations and some characteristics of the 500 mb surface over Central Europe.] *Z*
schrift für Meteorologie, Berlin, 13(7/8):145–162, July/Aug. **1959.** 2 figs., 5 tables, 14 r
German summary p. 145. **DWB, DLC**—The overlapping three-day mean values of the zo
components, of the meridional components and of the height of the 500 mb level and their si
day tendencies for the period 1949–1958 were used for the description of the altitude condit
over Central Europe. Their contraction to 3 classes each, then into 2 classes for the tenden
results in an objective division of the altitude situations into 216 elementary altitude proce
which will be connected into more complex altitude processes, in most cases, by the combina
of several classes. The European main weather situations are related to the soil situation by
code of KISSINGEN. First, is described by means of several tables, how the frequencies of m
weather situations behave at various single altitude parameters and at a series of combinat
of those parameters. There are stochastic connections between the frequencies of altitud
weather processes and the main weather situations which are best expressed according to
character of the weather. They are especially narrow at the meridional component and at
altitudinal pressures. The tendencies of the altitude parameters show also a certain, altho
less, relationships to the type frequencies. It is further demonstrated that most of the wea
processes can be attributed to an extensive basin-back which moves either over Central Eu
in any direction or is fixed and becomes flatter or slopes. It results also in a certain frequ
distribution of the cyclonity and of the main weather types in the basin-back system which all
a practically useful probability statement on the weather and on the main weather types.
method of description of the original circulation by altitudinal weather processes can be exte
to any other areas. A more objective and accurate description of the Central-European circul
can be obtained by application of altitude weather processes and of the main weather situa
for Central Europe which could be developed to probability statements on the occurrenc
weather reversions. *Subject Headings:* **1. Synoptic case histories 2. Central Europe—**

12L–271 551.509.318:551.577.33(2

Mertz, Jean, **Succession et durée des régimes météorologiques sur les Alpes.** [Succe
and duration of weather situations in the Alps.] *Germany. Deutscher Wetterdienst, Ber*
8(54):231–235, **1959.** 2 tables (fold). French, German and English summaries p. 231. D
DLC—This study established with a catalogue of the meteorological situations aims to invest
the different situations to occurring in the alpine area, the succession of meteorological situa
which are the most frequently observed. It should be possible to reconstruct conspicuous
cessions, as well as the alternation of some regimes during a rather long period. *Subject H*
ings: **1. Alpine meteorology 2. Alps.**—*Author's abstract.*

12L–272 551.50

Novikov, E. A., **K voprosu o predskazuemosti sinopitcheskikh protsessov.** [Pre
bility of synoptic processes.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.,* No. 11:1721–
Nov. **1959.** 2 refs., 13 eqs. Transl. into English in the corresponding number of its *Bu*
of the Academy of Sciences, USSR, Geophysics Series. **DLC**—For numerical forecastin
synoptic processes the hydrodynamic equation must be solved with reference to initial condi
which contain certain errors. The errors grow with the forecasting period and the scale o
field of initial error. The problem predictability was formulated in THOMPSON'S work, in
the growth of the average error in forecasting was evaluated in relation to the initial
The author considers the problem of forecasting conditions of the barotropic atmosphere d
by a function of certain coordinates, which are correlated with initial conditions. This eq
is solved with simple substitutions and the final equation is applied to an example. *Subject*
ings: **1. Numerical forecasting 2. Forecasting synoptic processes.**—*N.P.S.*

12L–273 551.509.318:551.547.5:551

§Paroczay, Ernest (*Extended Forecast Section, U. S. W. B., Wash., D. C.*), **The w**
and circulation of Nov. 1958: a mid-month reversal of weather regimes. *Monthly W*
Review, Wash., D. C., 86(11):439–446, Nov. **1958.** 6 figs., 10 refs. **DWB, DLC**—It was
by NAMIAS that for the period 1942–50 the month-to-month persistence of temperature, pre
tion, and 700 mb height anomaly in the United States was less from Oct. to Nov. than f

other pair of adjacent months. Recent Novembers have confirmed the fact that abrupt changes often take place between those months. In his study, NAMIAS also indicated that intramonthly fluctuations are common in Nov. November 1958 conformed, as a reversal in both temperature and precipitation was observed between the first and second halves of the month, with associated changes in the 700 mb height field and its jet stream. As a consequence of these changes, the eastern portion of the nation became warmer and wetter, while the west turned colder and drier. Because of the contrasting regimes that occurred during the month, it is difficult to discern in the monthly mean circulation underlying physical explanations of temperature and (especially) precipitation anomalies. For this reason the monthly circulation was divided into two 15-day periods to facilitate the association of observed anomalies with the changing circulation. *Subject Headings:* **1. Monthly mean circulation 2. 700 mb height anomalies 3. Temperature persistence 4. Precipitation persistence.**—*Author's introduction.*

12L–274 551.509.318

Pône, R., **Analyse tridimensionelle des masses d'air à l'aide de l'énergie totale.** [Three-dimensional analysis of air masses by means of total energy.] *International Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* Pub. London, Butterworth, **1956.** p. 31–37. 4 figs. **DWB**—The three-dimensional method of synoptic analysis consists of representing the soundings upon a chart in a kind of full perspective. Each sounding is reproduced on a reduced diagram upon which the location of the station is printed; the variable used is the pseudo-adiabatic potential temperature of a wet-bulb thermometer which is only a function of the entropy of the air, taken as water vapor. The analysis obtained by this method is verified by an analogous analysis but by using total energy of the air as a variable, which is represented on the diagram as the temperature equivalent to the total energy. The analytical procedure as applied to a specific synoptic situation on July 3, 1954 over Western Europe is illustrated. It was found that the energy representation for analyzing air masses is without practical interest since the results were identical and the calculation appeared more complicated. *Subject Headings:* **1. Air mass analysis 2. Three-dimensional air mass analysis 3. Energy analysis of air masses.**—*I.L.D.*

12L–275 551.506.3:551.501.9:551.509.318(497.1)

*Pristav, Janko (*Ljubljana*), **Meteorološka postaja Kredarica in njene lokalne značilnosti pri različnih vremenskih situacijah.** [The Kredarica meteorological station and its local importance in certain weather situations.] *Zagreb, Yugoslavia. Hidrometeorološki Zavod NR Harvatske, Rasprave i Prikazi,* 8(4):131–136, **1959.** Serbo-Croatian and German summaries p. 131–132. **DWB**—Climatological observations at the Alpinistenheim on Kredarica at 2515 m were obtained from 1897 to 1905 and in 1912. Regular meteorological observations have been maintained uninterruptedly since 1954. Of all the synoptic stations, this one provides more possibility for visual observations of fog conditions, lifting and sinking of the inversion-strata during anticyclonic conditions, the lability-scale of the atmosphere and the forecasting of the advance of a cold front. The values of the hydro and thermographs do not agree with the actual ones during snowfall because the meteorological screen becomes full of snow. The meteorological station is, despite its handicaps, valuable for the forecaster and complements the results of the surrounding stations which prepare the forecast for mountain regions. *Subject Headings:* **1. Weather services 2. Kredarica meteorological station services 3. Kredarica, Yugoslavia.**—*From author's abstract and O.T.*

12L–276 551.509.318:551.553.8:551.326.7(261)

§Rodewald, Martin, **Die Nordatlantik-Wetterlage im Frühjahr 1959.** [North Atlantic weather situation in the spring of 1959.] *Wetterlotse,* Hamburg, 149:161–173, July **1959.** 10 figs. **DWB**—An attempt is made to answer the questions whether the strong west winds observed by First Officer Reinert H. G. SCHULT, Jr. lasted during the whole period from April 3 to June 8, 1959 and if they were due to the exceptionally strong occurrence of ice at Newfoundland and on the coast of Labrador. The weather charts illustrate how the course of the ship coincided with the worst weather situation. The answer to the second part of the question shows that the wind rather than the ice mass was primarily responsible for the unfavorable weather. This explanation is supported by charts of normal-temperature of the surface water, pressure deviation, and weather situation. *Subject Headings:* **1. Marine meteorology 2. Synoptic conditions in North Atlantic 3. North Atlantic Ocean.**—*O.T.*

12L–277 551.509.318:551.515.1:551.511.2

Saltzman, Barry (*M. I. T.*), **On the maintenance of the large-scale quasipermanent disturbances in the atmosphere.** *Tellus,* Stockholm, 11(4):425–431, Nov. **1959.** 7 figs., 13 refs., 21 eqs. **DLC**—It is proposed that large-scale flow systems are maintained against dissipative

effects by: a transfer of kinetic energy from smaller, cyclone-scale; disturbances which h baroclinic energy sources; the processes involved being nonlinear, and barotropic. To illustr how such processes can operate, an example is given based on an idealized flow consisting o limited number of double-Fourier components. *Subject Headings:* **1. Large scale flow syste 2. Atmospheric disturbances.**—*Author's abstract.*

12L–278 551.511.2:551.509.

Saltzman, Barry and Fleisher, Aaron (*both, M. I. T.*), **The exchange of kinetic ene between larger scales of atmospheric motion.** *Tellus,* Stockholm, 12(4):374–377, Nov. 19 2 figs., 6 refs., eqs. **DLC**—The rate of transfer of kinetic energy between the different sc of eddies of the 500 mb geostrophic wind has been measured for each day of 1951. On average, there is a net transfer from intermediate (cyclone) scales to both longer and sho scales. *Subject Heading:* **1. Large scale atmospheric motion.**—*Authors' abstract.*

12L–279 551.509.318:551.578.45(261)(748,7

§Sanderson, Alan N. and Mason, Ralph B., Jr. (*both, U. S. W. B., Wash., D. C.*), **Beha of two East Coast storms, March 13–24, 1958.** *Monthly Weather Review, Wash., D. C.,* 86(109–115, March **1958.** 4 figs., 14 refs. **DWB, DLC**—Synoptic analysis of two major develo storms moving Northeast along the Atlantic Coast from March 13–24, 1958. Heavy pr and snow were responsible for heavy financial losses to transportation and utilities (storm A New England and storm B in Middle Atlantic). Causes of differences in post development havior of the two storms are discussed. No appreciable difference could be found in the sur patterns but storm A showed characteristics of a cold type occlusion and storm B of a w type occlusion; little thermal advection for A, and strong thermal advection for B. This s was "the worst in 40 years" in Pennsylvania, with 30″ to 40″ of snow in southeast Pennsylv and 25″ to 30″ in Northern Maryland. *Subject Headings:* **1. Synoptic case history stu 2. Record snowstorm, Maryland (March 1958) 3. Record snowstorm, Pennsylvania (M 1958) 4. Storms, North Atlantic (March 1958) 5. North Atlantic 6. New England Pennsylvania 8. Maryland.**—*M.R.*

12L–280 551.509.318:551.50

Starr, Victor P. (*Dept. of Met., M. I. T., Mass.*), **Trends of thought concerning m orological research.** *Geofisica Pura e Applicata,* Milan, 43:269–277, May/Aug. **1959.** 5 refs. English and German summaries p. 269. **DWB, DLC**—Certain problems of sym meteorology relating to the nature of the large quasi-stationary cyclonic and anticyclonic ce aloft, are examined from the standpoint of an hypothesis which seeks to connect their mainte with that of the smaller transient disturbances. The suggested link between these two scal eddies is in many ways similar to that operating in the general circulation in order to accoun the sustained existence of the circumpolar mean zonal motions, according to the more m concepts. Newer views concerning the dynamics of large convective processes, and the ess nonlinearity of the laws governing motions in the atmosphere, figure importantly in the argu advanced. *Subject Headings:* **1. Synoptic meteorology 2. Large-small scale circulation tionships 3. Circumpolar mean zonal motions.**—*Author's abstract.*

12L–281 551.509.318:551.51

§Suda, K. [*comp.*], **Large-scale weather trend from the viewpoint of 5-day mean 50 chart and zonal index. Journal of Meteorological Research,** Tokyo, 10(4):262–295, **1958.** 52 figs., table, 9 refs. In Japanese. **DWB**—Characteristic features of weather type of transitions affected by the westerly wind in the Northern Hemisphere using 500 mb 5-day chart and the features of general circulation of the atmosphere in West Japan are exam The principal results are as follows: 1) Of the northwestern monsoon type, during the of 1954–1956, there were two types of continuity and discontinuity. The former persisted week and was affected by a cold vortex of the upper layer at 60°N to south and 90°E to wes the latter was conditioned by a cold vortex with a typical high index at 60°N. 2) The fo of the beginning of the continuous bad weather was based on a continuity chart for Nov. and Jan. 1956 and depended on conditions (130–140°E). 3) During the bad weather tre spring and autumn, from the end of March to the beginning of April 1955, a cold vorte beset by advection of warm air. 4) The generation and disappearance of an anticyclone Sea of Okhotsk on 7 to 17 of June 1951, 3 to 15 of June 1952, and 18 to 29 of July 1 shown by a meridional chart of the westerly wind. 5) The zonal index, with a boundary of 45°N is shown. The conclusion is that seasonal characteristics and the regularities of cycle function by the change of index curve of low and high latitudes. *Subject Hea* **1. 5-day mean 500 mb chart 2. Zonal index 3. Large scale weather processes 4. W Japan 5. Sea of Okhotsk.**—*K.C.*

12L–282 551.509.318:551.577.2:551.515.82

Szepesi, Dezső, **Sviaz' uporiadochennykh i frontal'nykh vertikal'nykh skorostei s osadochnymi oblastiami bol'shogo razmera.** [The connection of the large-scale and frontal vertical velocities with the large-scale precipitation areas.] *Időjárás,* Budapest, 63(6):344–350, Nov./Dec. 1959. 6 figs., 3 refs., 3 eqs. English summary p. 344. Hungarian summary p. 350. **DLC**—The control by direct measurement of the large scale and frontal vertical velocities is a problem unsolvable at this time. We may estimate the reliability of the calculations on the basis of the large scale distribution of the cloudiness and the precipitation, by indirect method. The author compared the large scale and frontal vertical velocities calculated for the same period with the large scale distribution of the precipitation. In the examination the frontal vertical velocities showed better relation with the precipitation areas than the large scale vertical velocities. *Subject Headings:* **1. Large scale vertical velocities 2. Frontal vertical velocities 3. Precipitation distribution.**—*Author's abstract.*

12L–283 551.509.318

§*Irostnikov, M. V., **K voprosu o ritmichnosti ul'trapoliarnykh sinopticheskikh protsessov po Sibiri i Dal'nemu Vostoku.** [Problem of the rhythmicity of ultrapolar synoptic processes over Siberia and the Far East.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 51:124–149, 1957. 8 figs., numerous tables, 8 refs. **DLC**—Climatological and synoptic characteristics of "reperic" ultrapolar processes and their rhythmicity, established by V. P. Mul'tanovskiĭ and S. I. Pagava are reviewed with special attention to definite symptoms of the rhythmic activity of the atmosphere. Ultrapolar and "reperic" are defined as the movement of the anticyclonic core and cold air masses from the north or northeast. The ultrapolar territories are illustrated on three maps of the Northern Hemisphere with details for European-Asiatic and North-American regions and also for Atlantic and Pacific oceans. The regularity of the rhythmical processes are defined by ten rules and discussed in the text with charts and tables (including the tables on 13 pages). *Subject Headings:* **1. Synoptic processes over Siberia 2. "Reperic" ultrapolar processes 3. Synoptic processes over the Far East 4. Siberia 5. Far East.**—*N.P.S.*

12L–284 551.509.318:551.509.33

Tsepkanova, E. I. and Khesina, B. G., **Uchet predshestvuiushchego razvitiia atmosfernykh protsessov i raspredeleniia elementov pogody pri sostavlenii mesiachnykh prognozov pogody.** [Accounting for antecedent development of atmospheric processes and distribution of weather elements in preparing monthly weather forecasts.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 71:44–47, 1958. 2 tables, 3 refs. **DLC**—An attempt is made to explain the use of analogous development of synoptic processes and spatial distribution of temp. and pressure in preceding months in making 30-day forecasts of atmospheric temp. anomalies over the European U.S.S.R. and Western Siberia. The study of analogousness of preceding periods was made for Jan. and July for the period 1949–1953. The determination of an analogousness of the spatial distribution of temp. and pressure by the months being compared was visual and took into account uniform thermal and pressure fields and the general orientation of synoptic pressures over European U.S.S.R. and Western Siberia. The analogousness of temp. anomaly was determined objectively by the formula $P = \frac{n^1 - n_2}{N}$ where n^1 = number of agreement of temp. anomalies according to sign, n_2 = number of non-agreement of temp. anomalies according to sign, and N = total number of cases (excluding null values). The forecasts of atmospheric temp. anomaly in Jan. and July as a function of the distribution of atmospheric temp. and pressure anomalies and the development of synoptic processes in preceding months are presented in tables. *Subject Headings:* **1. Monthly weather forecasts 2. Temperature anomaly forecasts 3. Analogues 4. European U.S.S.R. 5. Western Siberia.**—*I.L.D.*

12L–285 551.588.2:551.509.318

Tu, Hsing-yüan, **Utochnennaia skhema ucheta nerovnosteĭ zemnoĭ poverkhnosti v chislennykh metodakh prognoza.** [Precise scheme for taking into account irregularities of the earth's surface in numerical forecasting methods.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 99:43–67, 1959. 8 refs., 20 eqs. Russian summary p. 47. **DWB**—A number of recent investigations show that irregularities of the earth's surface play an important role in the formation of large-scale atmospheric movements. In contrast to methods usually used the author refers the lower boundary condition to the contour level instead of sea level. The solution is obtained in the form of Taylor series conforming to small parameter increments, and is solved by the Fourier method for pressure trend and vertical speed. *Subject Headings:* **1. Numerical forecasting 2. Large scale atmospheric movements.**—*A.M.P.*

12L–286 551.509.318:551.513.1:551.524.35(

§Woffinden, Charles M. (*Extended Forecast Sec., U. S. W. B., Wash., D. C.*), **The weath and circulation of August 1958—a month with an unusual temperature reversal.** *Mont Weather Review,* Wash., D. C., 86(8):312–318, Aug. **1958.** 8 figs., 12 refs. **DWB, DLC** Over North America the mean flow pattern during Aug. 1958 was characterized by pronoun blocking in the extreme north and by a planetary wave in a relatively fast westerly at midl latitudes consisting of a ridge in the western United States and a trough in the East. In c trast to July 1958, these features of the westerly circulation were near their climatologica preferred locations for the month and hence closely resembled the normal map but with sligh greater amplitude. They were responsible for an unusually warm regime in the west, wh completely reversed the pattern of the previous month. A July–Aug. reversal of this magnit has occurred only once before in the past 17 years. *Subject Headings:* **1. Abnormal Aug weather, U. S. (1958) 2. Atmospheric circulation anomalies 3. Temperature anoma 4. Synoptic studies 5. United States.**—*Author's abstract.*

Synoptic Conditions for Hurricanes (551.509.318)

12L–287 551.509.318:551.515.21(

Chernov, Iu. A., **Uragan v raĭone poselka Mirnyĭ v noch' s 14 na 15 avgusta 1957** [Hurricane at Mirny on the night of Aug. 14/15, 1957.] In: Sovetskaia Antarkticheskaia Ekspeditsiia, 1955–, **Klimat Antarktiki.** Moscow, **1959.**) p. 274–277. **DLC** (QC994.9.K6) **DWB** (M82.1/99 M886kL)—A survey of the synoptic situation and weather in the Mirny reg during the period Aug. 12–15, 1957. A cyclone with a pressure in the center less than 980 proceeded southward from the Indian Ocean to the Kerguelen Islands. On Aug. 12, 13, 14 the horizontal gradient on the southwest periphery of the cyclone intensified. Northeast Wilkes Station a second quasistationary cyclone with a pressure of 985 mb in the center present. The two cyclones coalesced on Aug. 14 northeast of Wilkes Station and here be their regeneration. The synoptic situation is described in detail and it appears that it resem that described for July 23–Aug. 3, 1957. It is concluded that southeast winds of hurricane f in the Mirny region can be observed in the rear of a quasistationary cyclone with the center no east of Mirny (at a distance of 800–1400 km). This produces clear weather over the contin a wind from the southerly quarter, with a velocity greater than 20–30 m/sec is observed i considerable thickness of the troposphere (8–10 km). A closer location of the cyclone tow Mirny (or a more southerly position) leads to continuous cloud cover over the continent an sharp reduction in wind intensity. The station "Oasis" can serve as an indicator of the diminu of the glacial wind. Other possible instances of the intensification of wind to hurricane level associated with the anterior part of the cyclone, the cyclone center (more infrequent) and with displacement of the quasistationary cyclone along the periphery—by itself or during the pas of secondary fronts. *Subject Headings:* **1. Synoptic situations 2. Synoptic conditions hurricanes 3. Mirny, Antarctica.**—*I.L.D.*

12L–288 551.509.318:551.515.2:551.578.45

§Chernov, Iu. A., **Obzor sinopticheskogo polozheniia i pogody za period s 23 iiulia avgusta 1957 g.** [Review of the synoptic situation and weather conditions July 23 to Aug 1957.) (In: Sovetskaia Antarkticheskaia Ekspeditsiia, SSSR., 1955–,) **Klimat Antark** Moscow, **1959.** p. 270–273. fig. **DLC** (QC994.9.K6), **DWB** (M82.1/99 M886kL)—The sy tic situation and weather associated with a ten-day hurricane and snowstorm that occurre Mirnyi during the period July 23–Aug. 3, 1957 are described. The formation and passage cyclone on July 23 over Kergeulen Island and of a cyclone aloft north of Mawson Station influence of these cyclones on July 27, the formation on July 27 and influence on July 2 another pair of cycloes north of Wilkes Station and their regeneration are outlined. From Jul to Aug. 2 this quasistationary cyclone was northeast of Mirnyi, then approached to 600–700 off the coast and then moved 1200 to 1500 km away. The weather at Mirnyi along the coa Eastern Antarctica and in inland continental stations during the ten-day period is descr Data on pressure, wind velocities, air temperatures and visibility for individual days for M and other stations are given in the text. *Subject Headings:* **1. Antarctic climate 2. Syn situations 3. Synoptic conditions for hurricane 4. Mirny Antarctica 5. Wilkes Sta Antarctica.**—*I.L.D.*

12L–289 551.509.318:551.515.21/3

Dumont, André (*Chief Forecaster Port of France, Martinique*), **Notes of a study rel to the formation of hurricanes in the Antilles region.** (In: Caribbean Hurricane Sem Ciudad Trujillo, Feb. 1956, **Final Report of the Seminar,** pub. **1956.** p. 223–237. 4 m **DWB**—The cyclones of 1955 were studied with reference to their initial trajectories an

areas of formation. Initial conditions are: previous existence of a trough line of characterized convergence, or an organized Easterly wave or without indication of a closed circulation in the current from the East; partition of the sub-tropical belt of the Atlantic high pressure into two or three different anticyclonic structures with height; and the appearance of polar air, degenerated or not still having a component of displacement southeastward on its arrival in the northern portion of the tropical trough. Zones of formation in the Atlantic and Lesser Antilles are noted, followed by a brief discussion of the trajectories of beginning cyclones. *Subject Headings:* **1. Hurricane formation 2. Caribbean Hurricane Seminar 3. Antilles.**—*E.Z.S.*

12L–290 551.509.318:551.515.2:629.125.1

Rodewald, Martin, **Hurrikan Carrie und die "Pamir," Teil 6, Die Aspekte der Wetterlage ohne Aufnahme von Funkwetterberichten.** [Hurricane Carrie and the "Pamir," Pt. 6, Evaluation of the weather situation without considering radio weather reports.] *Wetterlotse,* Hamburg, No. 134: 161–164, Aug. 1958. **DWB**—The disaster of the sailing ship "Pamir" from Hurricane "Carrie" is explained by the failure of the ship to receive any outside weather forecasts and reliance only on ship board observations in the "good-weather Passage areas" of the eastern and central North Atlantic south of 35°N between Sept. 19th and 20th 1957. It is supposed that weather forecasts were received only after the ship board observations on Sept. 20th indicated a severe disturbance. Up to this time the nominal explanation of the observation of a constant swell from NNW was the location of the large Central Atlantic low when passing a high pressure ridge next to which, during weak winds, and at the later observed light barometric gradient no low could be supposed. The swell directed attention to the low northeast of the "Pamir," instead of to the storm "Carrie" advancing from west. *Subject Headings:* **1. Synoptic conditions for hurricanes 2. Hurricane "Carrie."**—*O.T.*

Synoptic Conditions for Drought (551.509.318)

12L–291 551.509.318:551.577.37:551.555.3(47)

Selianinov, G. T., **Agronomicheskoe ponimanie zasukhi i sukhoveia i ikh rasprostranenie na Evropeĭskoi territorii SSSR.** [The agronomical concept of drought and dry wind and their distribution in European USSR.] In: Akademiia Nauk SSSR. Institut Geografii, **Sukhovei ikh proiskhozhdenie i bor'ba s nimi.** Moscow, **1957.** p. 20–28. 5 figs., 6 refs.) **DLC** (QC940.R9A6)—The phenomenon of dry wind cannot be examined separately from the whole complex of meteorological conditions connected with the larger phenomenon of drought; they are genetically linked together and are produced by the same factors—the advance of the Azores' anticyclones which are the main cause of the drought phenomenon in the Steppe belt, to the west of the Volga River. By its nature, the dry wind does not essentially differ from drought, it can only increase the damaging effect of drought on plants. *Subject Headings:* **1. Sukhovei 2. Synoptic conditions for drought 3. European U.S.S.R.**—*A.M.D.*

12L–292 551.509.318:551.577.38(477)

§Pereiaslavaskaia, P. M., **Sinopticheskie usloviia zasushlivykh periodov v vostochnykh oblastiakh Ukrainy v tepluiu polovinu goda.** [Synoptic conditions for drought periods in eastern regions of the Ukraine during the warm seasons.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:87–92, **1950.** 5 figs., 3 tables. **DWB, DLC**—Typical charts of synoptic processes causing the onset of drought periods in April–July over Kharkov, Lugansk and Stalin Region, based TM-1 tables, daily synoptic and altitude charts as well as composite kinematic 500 mb pressure charts for individual natural synoptic periods were prepared and analyzed. The characteristic features of four types of such basic processes are discussed and the development of the surface synoptic process on 500 mb pressure charts is presented. *Subject Headings:* **1. Synoptic conditions for drought 2. Natural synoptic periods 3. Ukrainian S.S.R.**—*A.M.P.*

Synoptic Conditions for Heavy Rainfall (551.509.318)

12L–293 551.509.318:551.577.37(524–14)

Aoki, K. and Miura, S., **On the local heavy rainfall over southwestern part of Hokkaidō on April 21, 1958.** *Journal of Meteorological Research,* Tokyo, 11(6):475–483, June **1959.** 17 figs., 2 tables, 5 refs. In Japanese; English summary p. 475. **DWB, DLC**—A heavy rainfall was observed over Oshima Peninsula in Hokkaidō from dawn till evening on April 21, 1958. The results of an investigation on this heavy rain are shown. Principal results obtained are as follows: 1) in view of broad-scale analysis, meridional circulation was active during this period; 2) a sharp southerly jet (low level jet) was found along the Japan Sea coast at about 850 mb

level; 3) in addition to these circumstances, it was found that several conditions combined to fo convective instability. The descending motion associated with anticyclonic shear formed by meandering of the polar jet seemed to have been related to the overturning mechanism, a approaching cold front played an important role as trigger action to release convective ins bility; 4) on the autographic records of surface wind, temp., humidity, etc. at Hakodate a several stations, we found out that the passage of three-front systems, corresponded to the ra fall groups respectively; and 5) the rainfall distribution seemed to have been closely related the topography and to the southwesterly low level jet, and its amounts were examined by so numerical computations. *Subject Headings:* **1. Synoptic conditions for heavy rainfall Connective instability 3. Rainfall distribution 4. Hokkaido, Japan.**—*Authors' abstract.*

12L–294 551.509.318:551.558.21:551.577

Hanayama, Toshio, **On the local weather associated with the north-easterly wind in northern part of the eastern coast of Izu Peninsula.** *Journal of Meteorological Research,* Tok 9(7):537–539, July **1957.** 4 figs., 2 tables, 4 refs., 2 eqs. In Japanese. **DWB, DLC**— northern section of the eastern coast of Izu Peninsula has abnormal rainfall and other bad weat caused by the low pressure in the area which is due to eddy flow (air) as the most prevailing nc easterly wind crosses over Hakone Mt., and by the passing of cold front. Other activities of air mass around Hakone Mt. are discussed and a brief statistical account of weather and w conditions is reviewed. *Subject Headings:* **1. Orographic rainfall 2. Synoptic conditions heavy rainfall 3. Wind flow over mountains 4. Izu Peninsula, Japan.**—*J. Woo.*

12L–295 551.509.318:551.577.37(7

*Huff, F. A.; Semonin, R. R.; Changnon, S. A., Jr. and Jones, D. M. A., **Hydrometeorolog analysis of severe rainstorms in Illinois, 1956–1957 with summary of previous stor** *Illinois. State Water Survey, Report of Investigations,* No. 35, **1958.** 79 p. 68 figs., 14 tab 9 refs. **DWB**—In May, June and July 1957 four storms, some of the heaviest on rec occurred in Illinois. An analysis is given of each of these storms, and one which occurred May 1956. The analyses include the following items: 1) introduction; 2) isohyetal pattern characteristics of rainfall distribution; 4) depth-duration area relations; 5) antecedent rainf 6) synoptic weather, and 7) radar analysis. The rainfall data were obtained through state-w surveys from a variety of stations which made it possible to study the distribution in detail. summary of seven rainstorm analyses made for 1948–1956 is also included. *Subject Headin* **1. Synoptic conditions for heavy rainfall 2. Heavy rainfall analysis 3. Illinois.**—*G.T.*

12L–296 551.509.318:551.577.37(49

Khristov, P. Iv. and Pisarski, A., **Edin sluchaĭ na tvŭrde intenziven valezh v Bŭlga** [A case of very intense rainfall in Bulgaria.] *Khidrologiia i Meteorologiia, Sofia,* No. 3:45 **1956.** 2 figs., 3 tables, graph. Russian and English summaries p. 52–53. **DLC**—On Aug. 1951 a rainfall of an unprecedented intensity occurred in Bulgaria in the city of Stalin and vicinity, over an area of about 600 km². Its duration was 5½ hours and the quantity meas was 266 l/m² on an average. At certain places the rainfall amount reached 342 l/m². The r fall was due to the presence of a cyclone with its center over the area affected. Sea air from temperate zone and tropical sea air were involved. The local conditions, convergence of sur winds and the dynamic rising of air rich in humidity over the higher parts of the seashore in area, have proven to be particularly favorable to the formation of powerful cumulus rain cl from which this intensive rain fell. *Subject Headings:* **1. Rainfall intensities 2. Synoptic ditions for heavy rainfall 3. Stalin, Bulgaria.**—*Authors' abstract.*

12L–297 551.509.318:551.577.37:551.5

Mishutin, D. A., **Sinopticheskie usloviia pavodkoobrazuiushchikh dozhdei v Zakar** [Synoptic conditions for flood producting rains in Transcarpathia.] *Kiev, Ukraine. Nauc Issledovatel'skiĭ Institut, Trudy,* No. 5:126–149, **1956.** 18 figs., 14 refs., 6 tables. **DWB, I** —The study of flood producing rains was carried out by way of plotting composite-static thickness charts on which surface and upper level pressure formations with indications of tro and ridges were drawn. This made it possible to classify and assemble in 4 graphs representa of the synoptic processes in whose presence flood producing rains usually occur. *Subject H ings:* **1. Synoptic conditions for heavy rainfall 2. Synoptic conditions for floods 3. Tr carpathian Region, U.S.S.R.**—*A.M.P.*

12L–298 551.509.318:551.577.37(4

*Németh, Tivadar, **Az 1958. június 10. és 13. között lehullott nagy csapadék makroszi tikai vizsgálata.** [Synoptic analysis of the heavy rainfall between June 10 and 13, 1

Időjárás, Budapest, 63(2):112–115, March/April 1959. 4 figs., 4 refs. **DLC**—An explanation for the unusual monsoon phenomena in June over Hungary, with a thorough analysis of the meteorological and climatological features in Europe at the time of the heavy precipitation. It is emphasized that the presence of a strong and lasting frontal zone, and the presence of the corresponding synoptic situation of atmospheric pressure is not sufficient for the genesis of heavy precipitation without enough and, continually supplemented, humidity. The analysis is illustrated by a diagram showing the daily temperature anomaly in Budapest between May 19 and June 13, 1958, and by maps showing the distribution of precipitation in Hungary from June 10 to 14; the barometric and altitudinal variations of the 200 and 700 mb strata in Europe in the June 7–11 and June 11–14 periods and finally, the alteration of humidity over Europe from June 10 to June 11. The references contain papers on similar observations for the years 1951, 1953, 1954 and 1955. *Subject Headings:* **1. Synoptic conditions for heavy rainfall 2. Heavy rainfall 3. Hungary.**—*O.T.*

12L–299 551.509.318:551.577.37(47)

Lebedeva, N. V.; Mishutin, D. A. and Pikush, N. V., **Katastroficheskiĭ liven' v Nikolaeve.** [Catastrophic downpour in Nikolaev.] *Meteorologiia i Gidrologiia*, No. 1:37–41, Jan. 1957. 4 figs., table. Transl. into English by John Miller, issued by American Meteorological Society, under Contract AF 19(604)-1936, Oct. 1958. 7 p. Complete. **DWB, DLC**—A detailed description of a downpour accompanied by thunderstorm and hail which took place on June 30, 1955 at Nikolaev, over a period of about 4 hours 195.0 mm rain fell at the weather station and a maximum intensity of 10 mm/sec. Data are presented on the distribution of rainfall at various distances from Nikolaev. The synoptic conditions associated with this downpour are analyzed. It is shown that on June 30, 1955 there prevailed at Nikolaev favorable conditions for the development of free (thermal) convection, accompanied simultaneously by a rise of the entire column of air also causing condensation of moisture and the necessary moist adiabatic convection from the upper layers. *Subject Headings:* **1. Rainstorms 2. Synoptic conditions for heavy rainfall 3. Nikolaev, Ukrainian S.S.R.**—*I.L.D.*

12L–300 551.509.318:551.577.37(52)

§Momose, E., **Synoptical study on the local heavy rainfall in Nagano Prefecture.** *Journal of Meteorological Research, Tokyo*, 8(11):715–722, Dec. **1956.** 15 figs., 3 tables. In Japanese; English summary p. 715. **DWB, DLC**—Two sample cases of FNL type heavy rainfall in the western section of Nagano prefecture are synoptically reviewed. The wet tongue penetrates along the coast of the Sea of Japan. Convective instability is pronouncedly increased by penetration of the cold (dry) tongue in the middle layer. The cold front moves inland from the coast of the Sea of Japan and forms a stationary front. Southerly wind becomes prevailing at the center of the Matsumoto plain, the heavy local rainfall seems to be due to the breaking of convective instability when warm and moist southerly winds over the western mountain section. *Subject Headings:* **1. Synoptic conditions for heavy rainfall 2. Orographic effects 3. Nagano Prefecture, Japan.**—*J. Woo.*

12L–301 551.509.318:551.577.37(522)

Takenaga, K. and Yabana, W., **Local analysis and forecast of heavy rainfall at Isahaya in Nagasaki prefecture on July 25, 1957.** *Journal of Meteorological Research*, Tokyo, 11(10): 839–850, **1959.** 30 figs., 6 refs. In Japanese; English summary p. 839. **DWB, DLC**—Isahaya region in Nagasaki Prefecture suffered great damage by a severe flood due to the heavy rainfall amounting to about 100 mm a day. The author analysed synoptically the mechanism of the local heavy rainfall with special reference to the instability line. As the result of this study, it may be said that several atmospheric phenomena, such as the appearances of lower W-ly jet and V-shaped moist air mass in the upper air, the oscillations of pressure and temperature at the surface due to down draft and the formations of traveling thunderstorm and gust, and the convergence of warm air, all are significant for the formation of heavy rain. *Subject Headings:* **1. Heavy rainfall forecasting 2. Synoptic conditions for heavy rainfall 3. Nagasaki, Japan.**—*Authors' abstract.*

12L–302 551.509.318:551.577.37

Yasuda, K., **A case study of extraordinarily heavy rainfall in Tajimi area.** *Journal of Meteorological Research*, Tokyo, 11(11):901–913, **1959.** 14 figs., 2 tables, 9 refs. In Japanese; English summary p. 901. **DWB, DLC**—After the large and small scale synoptic situations for the case of extraordinarily heavy rainfall in Tajimi area (Gifu Prefecture) on Aug. 7 and 8, 1957, were analyzed, the comparison was made between the observed rainfall amount and one calculated from small-scale surface divergence and orographic effect. It was concluded that, though the large scale synoptic patterns suggest the possibility of outbreak of heavy rainfall, it

is rather beyond our power to forecast such a great amount of concentration of rainfall in limited area, exactly and precisely. *Subject Headings:* **1. Heavy rainfall 2. Heavy rain forecasting 3. Synoptic conditions for heavy rainfall 4. Tajimi area, Gifu Prefectu Japan.**—*Author's abstract.*

Synoptic Conditions for Fog (551.509.318)

12L–303 551.509.318:551.575.1(4

§Ardel'ianov, A. M., **Usloviia obrazovaniia tumanov v raione Simferopol'skogo aeropo** [Conditions of fog formation in the region of the Simferopol' Airport.] *Kiev, Ukraine. N chno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 7:139–146, 1957. 5 figs tables. **DWB**—Certain local peculiarities, under the influence of which fog most frequently in, are considered. The data taken from records of Simferopol' meteorological station, for period 1947–1955, was used. The selection of the data is explained. The recurrence, time setting in and lifting of the fog are analyzed, and illustrated with graphs, diagrams and tal The recurrence of cold and warm fronts is considered. Certain synoptic conditions are analy illustrated with synoptic charts and a graph of the changes in temperature and the point of formation. The conditions under which the fog moves from the Black Sea are mentio *Subject Headings:* **1. Synoptic conditions for fog 2. Synoptic charts 3. Simferopol', Uk nian S.S.R.**—*B.J.G.*

12L–304 551.509.318:551.5

Koshelenko, I. V., **Sinopticheskie usloviia obrazovaniia advektivnykh tumanov.** [Syn tic conditions for the formation of advection fogs.] *Kiev, Ukraine. Nauchno-Issledovatel' Gidrometeorologicheskiĭ Institut, Trudy,* No. 5:17–177, 1956. 5 figs., 2 tables, 2 refs. **D DLC**—On the basis of a study of advective fog over Central European U.S.S.R. from 194 1953, it was established that advective fog is observed in more than 50% of the cases in presence of 5 types of synoptic situations. Each of these types are examined and shown weather charts. Tables showing the recurrence and mean duration of fogs according to syno situation types are included. *Subject Headings:* **1. Advection fogs 2. Synoptic conditions fog.**—*A.M.P.*

12L–305 551.509.318:551.575.1(

Krasikov, P. N. and Bashkirova, G. M., **Meteorologicheskie usloviia pri zimnikh angarsk tumanakh v raione g. Irkutska.** [Meteorological conditions during winter fogs caused by Angara River in the Irkutsk District.] *Leningrad. Glavnaia Geofizicheskaia Observato Trudy,* No. 73, 12–23, 1958. 10 figs., 3 tables, 8 refs. **DWB**—The results of a compreher study of fogs during the winter months near the city of Irkutsk. These fogs persist from sev hours to 24 hours, attain heights of 100–300 m and sometimes visibility is reduced from 30 50 m. Such fogs are formed under the influence of the Angara River which does not fr until the middle of Jan., when negative temperatures prevail. The points of observations described with the aid of a map. A detailed account is given of the meteorological observat and the results, which are presented in tables and graphs, giving number of cases and total d tion of fogs of varying intensity observed in Irkutsk Dec. 11, 1955–Jan. 2, 1956, wind observed during this period, variations of meteorological elements according to 24 hour observa during this period, mean relative humidity of the atmosphere at Irkutsk, area of extension of in the region of Lake Baikal-Irkutsk on Dec. 21 and 22, 1955, and variation of air tempera with height. The winter Angara fogs in the Irkutsk District are formed at an air tempera of −10 to −12°C, relative humidity of 50–80% and wind velocity from calm to 3–4 m/sec. principal cause of fog formation is shown to be the large difference between the air tempera over the warm water surface of the river and over land. The characteristics of the evapor fogs observed at Irkutsk are discussed. *Subject Headings:* **1. Synoptic conditions for fog Fog formation 3. Winter fog 4. Irkutsk District, Siberia.**—*I.L.D.*

12L–306 551.509.318:551.575.1(

Natarajan, G. and Banerji, R. C. (*both, Met. Office, Agartala*), **Fog over Agartala air** *Indian Journal of Meteorology and Geophysics,* Delhi, 10(2):161–168, April 1959. 7 fig tables, 2 refs. **DWB, DLC**—An analysis has been made of fog formation at Agartala Air India, with the view of contributing to the maximum possible use of the airport in the morning hours. The study covers the period between Oct. and March, the general fog m at Agartala. First, sources of data, fog onset and dissipation times, occurrence of fog at neighboring airfields, fog duration and intensity and its contributory factors have been disc and finally, assessment has been made of the synoptic situation and its association with Pertinent data has been illustrated by maps, table and charts. *Subject Headings:* **1. Fog fo**

tion 2. Synoptic conditions for fog 3. Airport visibility 4. Agartala Airport, Tripura, India.—*I.S.*

12L–307 551.509.318:551.575.1(477)

*§Podgornaia, A. D. and Khorunzheĭ, O. I., **Usloviia obrazovaniia tumanov v raĭone Khersona.** [Conditions for the formation of fogs in the Kherson region.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:35–40, 1959. fig., 13 tables. **DWB, DLC**—A study of conditions favorable to the formation of fogs in the Kherson region based on observation and aero-synoptic data for 1951–1957 is presented. The analysis comprised cases of fog formation including 114 cases of radiation, 202 cases of advective and 131 cases of frontal fogs. Tables showing the mean duration and recurrence of fogs and a graph indicating the relation between the dew point determined at sunset and the air temperature at the moment of fog formation (making the forecasting of radiation fog more precise) are appended. *Subject Headings:* 1. Synoptic conditions for fog. 2. Kherson Region, Ukrainian S.S.R.—*A.M.P.*

12L–308 551.509.318:551.575.1

§Vinokurov, N. E. and Okuneva, N. V., **O tumanakh v raĭone Kieva.** [Fogs in the Kiev region.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:25–34, 1959. 11 tables, 3 refs. **DWB, DLC**—This study of 292 cases of fog in the Kiev region during 1951–1952 considering aero-synoptic conditions prevailing at their formation and dissipation, makes it possible to get an idea of the recurrence, during and intensity of radiation, radiational-advective, advective, frontal and sub-inversion fogs separately as shown in numerous tables, one table showing the recurrence of fog types in the presence of various values of relative humidity depending on temperature in 1951–1955. *Subjct Headings:* 1. Synoptic conditions for fog 2. Kiev, Ukrainian S.S.R.—*A.M.P.*

Synoptic Conditions for Squalls (551.509.318)

12L–309 551.509.318:551.553.8(477)

Kotomkin, N. E., **Shkval v raĭone g. Sumy.** [A squall near Sumy.] *Meteorologiia i Gidrologiia,* Leningrad, No. 4:25–26, April 1958. **DWB, DLC**—The synoptic conditions associated with the occurrence of a squall, accompanied by intense thunder and lightning, that occurred during the evening of Aug. 23, 1957 near Sumy and the effects of the squall are described. The squall was preceded by very hot and dry weather. At 12 noon Aug. 23 a quasistationary front with wave disturbances lay in the center of the trough of a cyclone centered over Kherson. At the surface the line of the front extended from the Crimean peninsula northward to Nezhin-Smolensk. Near Sumy parts of the trough showed the presence of a strong south-east wind at 300–1500 m. Cold air was present behind the cyclone along the line of the quasi-stationary front. At 1800 hrs. the sky was covered with high stratus and a dust haze appeared. In the frontal zone, thunderstorms began. At 1915 hrs south of Sumy a thick gray rain cloud appeared against the background of the alto-stratus cloud. Its parts moved chaotically and thunder was audible from the south. A dust storm arose at 1940 hrs with winds of 26–28 m/sec accompanied by incessant lightning and visibility fell to 100 met. The squall lasted 40 min. The air temperature fell from 30° to 20°C. Bolt lightning was observed during the squall. *Subject Headings:* 1. Squalls 2. Synoptic conditions for squalls 3. Sumy, Ukrainian S.S.R.—*I.L.D.*

12L–310 551.509.318:551.553.8(477)

§Shpak, I. S. and Murzin, L. P., **Shkval v raĭone TSimlianskogo vodokhranilishcha 25 iiunia 1956 g.** [Squall in the Tsimlyansk reservoir region on June 25, 1956.] *Meteorologiia i Gidrologiia, Leningrad,* No. 4:28–30, April 1957. 2 figs. Transl. into English by John Miller, issued by American Meteorological Society under Contract AF 19(604)-1936, Dec. 1958. 4 p. Complete. rough draft. **DWB, DLC**—The synoptic conditions associated with the occurrence of a squall over the Tsimlyansk reservoir are described with the aid of a synoptic chart for the day in question. During the passage of a cold front from the west to the eastern Caucasian coast of the Black Sea a wave developed upon it. This wave was transformed into a cyclone on the morning of 25 June with a pressure of 1000 mb at the center. In the trough of this cyclone extended northward another front passed. Air temperature at noon anterior to the front reached 34–36°C and in the rear of the front it was above 15°C. The wave on the front rapidly moved northward and passing through Caucasus ridge the cyclone opened the way for an incursion of cold air over the northern Caucasus. As the cold front moved towards Tsimlyansk moist air masses from the irrigated areas were drawn in above the cold front so that rain and thunderstorm developed. Over the Tsimlyansk reservoir the squalls reached an intensity of 20–25 met/sec.

Isochrones of the beginning of the frontal passage are shown on a map. The damage done the squalls, their effect on water level, etc. are described. *Subject Headings:* **1. Squalls Synoptic conditions for squalls 3. Tsimlyansk Reservoir, Rostov Region, R.S.F.S.R.**—*I.L.*

Synoptic Conditions for Snowstorms (551.509.318)

12L–311 551.509.318:551.578.45:551.555.6(

*Erofeeva, A. I., **Sinopticheskie usloviia sil'nykh meteleĭ na Omskoĭ zheleznoĭ dorc** [Synoptic conditions for severe blizzards on the Omsk railroad.] *Sbornik Rabot po Sinopti* Leningrad, No. 2:3–15, **1958.** fig., 9 tables, 15 refs. **DWB**—The study covers 58 cases strong snowstorms with winds of 15 m/sec or more which occurred in 1947–1954. It is sho that the blizzards were caused by active cyclonic processes covering extended areas. The ov whelming majority of deep cyclones passing over the Omsk Region were accompanied by str winds, snowstorms and sharp temperature oscillations. Exceptionally sharp changes of weat were caused by cyclones that developed in the regions of the Black, Caspian and Aral S Protracted and abundant snowfalls, causing a rapid increase of the snow cover thickness, snowstorms in the case of strong winds were observed in the front part of the cyclones. Tal showing the mean number of days with blizzard, the recurrence of various wind velocities dur snowstorms of various types are appended. Methods of forecasting snowstorms for 1–2 days advance and their expected intensity are also discussed. *Subject Headings:* **1. Synoptic con tions for snowstorms 2. Blizzard frequencies 3. Snowstorms 4. Omsk Region, U.S.S** —*A.M.P.*

12L–312 551.509.318:551.578.45(4

Gavrilenko, N. M., **Sinopticheskie usloviia meteleĭ na territorii Ukrainskoĭ SSR.** [Syn tic conditions for snow storms in the Ukrainian S.S.R.] *Kiev, Ukraine. Nauchno-Issledova skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 5:210–224, **1956.** 7 figs., table, 4 refs. **DW DLC**—An analysis of synoptic data for 1944–1952 made it possible to divide the synoptic proce that generate snow storms into 4 basic groups: 1) snow storms originating during the pass of a trough or of a cyclonic disturbance over the Ukraine from north or northwest; 2) s storms occurring during the displacement of cyclones or their troughs onto the Ukraine from so or southwest; 3) snowstorms occurring on the south western or southern periphery of anticyclo situated over the European U.S.S.R. in the presence of a depression over the Black Sea, and snow storms in the Ukraine during the passage of a trough from the west. The recurrence duration of snow storms in the Ukraine are also discussed. *Subject Headings:* **1. Synoptic c ditions for snowstorms 2. Snowstorms, Ukrainian S.S.R. 3. Ukrainian S.S.R.**—*A.M*

12L–313 551.509.318:551.578.45(58

§Grebeniuk, E. V. and Duletova, T. A., **Sinopticheskie usloviia vozniknoveniia obil'n snegopadov v Kazakhstane.** [Synoptic conditions for the formation of heavy snowfall Kazakhstan.] *Alma-Ata, Kazakhstan. Nauchno-Issledovatelskiĭ Gidrometeorologicheskiĭ Insti Trudy,* No. 10:92–103, **1959.** 6 figs., 2 refs. **DWB**—The greatest frequency of snow occurs in the western and northern parts of Kazakhstan and on the western (windward) sid the mountains. An analysis of the study of snow storms in the literature is included. I collected during 1948–49 and 1952–53, relief maps, barometric maps, and maps of precip. tribution show the details of distribution of snow. Data from 105 stations are used. In eastern side of mountain ranges less snow falls and accumulates, the mountains serving a barrier to the wind from the west. *Subject Headings:* **1. Synoptic conditions for snow sto 2. Kazakh S.S.R.**—*E.Z.S.*

Synoptic Conditions for Glaze (551.509.318)

Miscellaneous

12L–314 551.509.318:551.574.42(

§Rusanov, V. I., **Sinopticheskie usloviia obrazovaniia redkogo sluchaia gololedo.** [Sy tic conditions for the formation of unusual cases of glaze.] *Meteorologiia i Gidrologiia,* Mos No. 2:28–29, Feb. **1957.** 4 refs. **DWB, DLC.** Transl. into English available for refere **DWB** (M78.41 R949sy)—The synoptic conditions associated with the occurrence of glaze temperature range of 0–3°C which is regarded as the temperature of usual occurrence of g At Pudino (Tomsk Region) glaze formed during a period when the air temperatures fell 17.5°C to −14.9°C. Pudino was in the warm sector of a cyclone anterior to a polar front detailed account of the air flow, air temperature, etc. associated with the glaze occurrenc presented. A similar occurrence of glaze in Kargaska (Tomsk Region) is described. *Su*

Headings: **1. Synoptic conditions for glaze 2. Glaze formation 3. Pudino, Tomsk Region, U.S.S.R.**—*I.L.D.*

12L–315 551.509.318:551.591(497.2)

§Stefanow, S. J., **A Bulgária feletti jó és rossz vízszintes látás szinoptikus föltételei.** [Synoptic conditions for good or poor horizontal visibility over Bulgaria.] *Időjárás,* Budapest, 61(2):85–94, March/April 1957. 8 figs. English summary p. 85; German version p. 149–155. **DLC**—Sample synoptic charts are presented, showing typical situations connected with good or poor visibility in Bulgaria, namely: 1) good visibility during cold air, 2) warm-air advection, 3) poor visibility with no advection, 4) with advection of dust from outside the country and 5) with a pressure field without gradient. General characteristics of each of these situations are discussed. *Subject Headings:* **1. Synoptic conditions for visibility 2. Visibility 3. Poor visibility 4. Bulgaria.**—*G.T.*

12L–316 551.509.318:551.576.1(477)

*Gromokovskiĭ, S. A., **Usloviia obrazovaniia nizkoĭ oblachnosti v raĭone Zaporozh'ia.** [Conditions for the formation of low cloudiness in the Zaporozhe region.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:41–47, 1959. 15 tables. **DWB, DLC**—For the analysis each case was referred to a definite synoptic situation which in its turn was divided into intra-mass and frontal situations further subdivided into types. The frequency of low cloudiness (in percent) in the presence of various synoptic situations, as well as the duration is shown in tables. Further, the meteorological conditions of low cloudiness formation were studied and the results are presented in a series of tables with reference to individual meteorological elements and weather phenomena. It is shown that the negative-difference between factual temperature and the dew point and the incoming air is an indication of the lowering of the lower border of cloudiness. *Subject Headings:* **1. Low cloudiness 2. Synoptic conditions for low cloudiness 3. Zaporozhe, Ukrainian S.S.R.**—*A.M.P.*

12L–317 551.509.318:551.578.45(498)

Bălescu, O. I. and Besleagă, N., **Cîteva viscole din tara noastră.** [Stormy weather in Romania.] *Meteorologiia, Hidrologia şi Gospodărirea Apelor,* Bucharest, 3(4):11–16, **1958.** 8 figs., 7 refs. Russian summary p. 75; French summary p. 77; and English summary p. 79. **DWB**—After several remarks on the various ways of tackling the problem of the "viscole" (the Romanian term for the complex phenomenon of wind intensification and snowfall) and after defining this phenomenon, the authors made a survey of the most intense "viscole" in Romania, for every month, briefly analyzing the synoptical conditions which generate them. The paper points out that Romania constituted a favorable ground for the formation of the phenomena which may take place during seven months of the year, from Oct. until April, occasionally in the mountain region in Aug; the highest frequency is in Jan. and Feb. In all cases presented, the high intensity of the phenomenon was a result of the exceptionally great baric gradient and of a pronounced thermic discontinuity of the air masses which came in contact. *Subject Headings:* **1. Synoptic conditions for Viscole 2. Viscole 3. Wind-snowfall intensification 4. Romania.** —*Authors' abstract.*

12L–318 551.509.318:551.515.11(584.6)

Duletova, T. A., **O chetvertoĭ stadii tsiklonov.** [Fourth stage of cyclones.] *Alma-Ata, Kazakhstan. Nauchni-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:88–91, **1959.** 2 figs., 4 refs. **DWB**—The classification of cyclones according to their stage of development might be helpful. In their fourth stage, cyclones are symmetrical, generally diffuse but with a cold nucleus. This stage is recognizable at the termination of the natural synoptic period which ends with a system of high barometric formations and is observed to be the predominant form of the ending of the natural synoptic period. *Subject Headings:* **1. Synoptic conditions for cyclone formation 2. Cyclone classification 3. Kazakh S.S.R.**—*E.Z.S.*

12L–319 551.509.318:681.177

*†Franceschini, Guy A., **Forecasting micrometeorological variables.** Texas A. & M. College. Dept. of Oceanography and Meteorology, Contract AF 19(604)-2250, Final Report, Dec. **1959.** 55 p. 20 figs., 21 tables, 4 refs. **DWB**—An objective evaluation was conducted on the utility of a specialized analogue computer for micrometeorology. Values of parameters simulated by the computer are compared with values observed. Parameters of concern were: air temperature at a height equal to the roughness parameter (z_0); air temperature at 2 m; temperature difference between ½ m and 4 m; wind speed at 2 m; vapor pressure at 2 m; and relative humidity at 2 m. Results are shown in graphs of simulated and observed values as a function of time, and tables of

statistical parameters of the verification. Comparisons were made for five different periods involving four locations. The locations, all in Texas, represented appreciably different surface Meteorological conditions were varied and included the following air mass types: arctic, maritin polar, continental polar and maritime tropical. A brief description of each site with a summa of its attendant meteorological conditions is given. Although appreciable difficulty was expe enced in keeping the computer in operation, in general the simulated results were good. Ho ever, the computer tends to minimize the diurnal amplitude of the variables. Weakest areas the computer were: temperature lapse rate when strong stability was observed; vapor pressu when high values existed; and wind speed generally. Suggestions for future work are giv *Subject Headings:* **1. Micrometeorological variables 2. Analog computers 3. Texas.** *Author's abstract.*

12L–320 551.509.318:551.524.36(47

§Goncharova, E. F., **Sinopticheskie usloviia anomal'no kholodnoĭ vesny 1952 g. na Severn Kavkaze.** [Synoptic condition during the usually cold spring of 1952 in North Caucasu *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 51:117–123, **1957.** 4 figs., 1 ref. D —The synoptic conditions during periods from 1891 to 1952 are analyzed in respect to special conditions of weather with temperatures below average. Three types of synoptic proces are described with the following basic characteristics: 1) anticyclones from Scandinavia shift to Baltic and Ukrainian regions; 2) generally lowered temperature and high altitude depress above the north eastern European territories with extension from the Mediterranean Sea to Baltic Sea, and 3) broad high altitude depression above the northern half of the European te tory of the USSR and with extension to the south of Black Sea. The analogy is illustra with average daily temperature curves and synoptic maps. *Subject Headings:* **1. Synoptic c ditions for unusually cold spring 2. Synoptic processes 3. North Caucasus, U.S.S.R** *N.P.S.*

12L–321 551.515.13:551.509.318(4

§Hänsel, Ch., **Der Sturm über Norddeutschland vom 25. August 1956.** [Storm over no ern Germany on Aug. 25, 1956.] *Zeitschrift für Meteorologie,* Berlin, 12(8):230–243, A **1958.** 8 figs., 18 refs. German summary, p. 230. **DWB, DLC**—The unusual violence of storm (74 knot wind) was investigated. The analysis includes descriptions of hemispheric European synoptic aerologic conditions and data on the weather conditions to demonstrate mechanism of the storm depression. The paper is well furnished with maps, charts and tab The marked difference of the meteorological course in the horizontal and vertical plane is appa from station recordings and cross sections. *Subject Headings:* **1. Severe storm analysis Synoptic conditions for storms 3. Germany.**—*W.N.*

12L–322 551.509.318:551.57

§*Iakovlev, B. A., **Izbytok i defitsit osadkov na Kol'skom poluostrove v estestvenn sinopticheskikh periodakh teplogo polugodiia.** [Excess and deficit of precipitation in Kola Peninsula during natural synoptic periods during the warm period of the year.] *Sbo Rabot po Sinoptike,* Moscow, No. 3:77–91, **1959.** 7 figs., 5 tables, 3 refs. **DWB**—Investigati during the summer months, May–Sept. An 11-year series of observations (1943–1953) was u All the periodic precipitation totals depend primarily upon the nature of the developing syno processes in a natural synoptic period and to a lesser extent upon its duration. The precipita totals were found to be not only highly variable in time but also in space so that the precipita totals averaged for the western half of Murmansk were used as criteria for selecting the dr and rainiest natural synoptic periods. For both groups mean 500 mb of cyclone and anticyc trajectories were constructed. Dry weather in the Murmansk Region is characterized by a and stationary anticyclone which on the 500 mb map is represented by the typical deform field aloft during the dry natural synoptic periods. A typical deformation field aloft forme two cyclones aloft and containing two high altitude frontal zones is described with the ai an 500 mb map. It was found that in all natural synoptic periods with anticyclones aloft the Kola Peninsula or closely adjacent regions, i.e. during natural synoptic periods analogou dry periods, a frequency of periodic precipitation totals less than 3 mm is observed in add to Kola and Krasnoshchel'ye in more than 80% of the cases. But this high frequency of p precipitation totals is not caused primarily during the summer. The mean frequency of precipitation is 30% so that there is a close relationship between dry weather over the Peninsula and stationary anticyclones aloft. Natural synoptic periods with excess precipiti were associated with the passage of southern cyclones either to the north or northeast. Depen upon the direction of movement of the cyclones across the Kola Peninsula 2 types of na synoptic periods characterized by excess precipitation are determined, viz: southwest and s

these are described with the aid of 500 mb maps and with maps showing trajectories of cyclones. Data on the frequency of periodic precipitation in natural synoptic periods characterized by excess, and frequency of periodic precipitation exceeding 10 and 15 mm are presented. Also indications for forecasting excess and considerable deficit of precipitation during natural synoptic periods according to their tendency are presented. *Subject Headings:* **1. Synoptic conditions for precipitation 2. Natural synoptic periods 3. Murmansk Region, R.S.F.S.R.**—*I.L.D*

12L–323 551.509.318:551.515.1:550.342(262.5)

Kostina, A. F., **O sviazi mikroseĭsmicheskikh kolebaniĭ, nabliudaemykh v Krymu, s meteorologicheskoĭ obstanovkoĭ nad Chernym morem.** [The relations between microseismic oscillations observed in Crimea and meteorological conditions over the Black Sea.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 8:1029–1032, 1958. 7 figs. **DLC**—A comparison of several instances of very intense microseismic oscillations ("microseismic storm") recorded in 1955 and 1956 at the Simferopol seismic station, with synoptic conditions, has revealed the existence of two types of microseisms. One type is of Atlantic, or rather Scandinavian origin (Jan. 3–4); the amplitude began to increase during 12–14 hrs (Moscow time), reached a maximum of 5 μ at 18–20 hrs and ceased 10–12 hrs on Jan. 4. The prevailing synoptic situation was a deep cyclone moving from the south Greenland Sea in an easterly direction at 9 hrs Jan. 3 at the time when the microseisms began to intensify; the center of the cyclone was north of the Norwegian Sea and its periphery included the entire Greenland and Norwegian Seas. The microseismic oscillations were at maximum when the center was closest to the continent. As the cyclone filled up, the microseism oscillations cleared. The second type of microseism oscillation includes those having a period of 3–4 sec and arriving during the passage of a cyclone over the Black Sea or during deep lows associated with cold fronts. Such a case was observed on March 9–10, 1956 when a cyclone moved slowly across the southern part of the Black Sea. The maximum intensity was attained at 12 o'clock when the cyclone was closest to the shores of the Crimea; the oscillations cleared when the center moved on to southwest Ukraine. A case involving the simultaneous influence of two microseism sources is discussed. *Subject Headings:* **1. Microseismic storms 2. Synoptic conditions for microseisms 3. Black Sea.**—*I.L.D.*

12L–324 551.509.318:551.578.4(764)

McCrabb, Harold S., **Snowfall at San Antonio on March 16, 1959.** *Monthly Weather Review*, Wash., D. C., 87(3):100, March 1959. **DLC**—On March 16, 1959 between 0755 and 0830 CST, flakes of snow were observed and recorded as a trace at San Antonio at a time when the freezing level was at least 6000 ft above the surface and the surface temp. never fell below 50°F. Conditions aloft favored precip.; at 700 mb—trough passed over the station, and at 500 mb there was evidence of "digging" to the southwest of San Antonio with a major trough shearing over North Texas and the forecast cut-off low in West Texas was evident on the 1200 GMT 500 mb chart for March 17. The temp. at 500 mb dropped from —16°C to —19°C in the 24 hrs ending at 0000 GMT March 17. The most plausible explanation for the snowfall papers to be that the snow reached the ground in the cool air of vertical downdrafts from high level thunderstorms or cumulonimbus clouds. *Subject Headings:* **1. Synoptic conditions for snowfall 2. San Antonio, Tex.**—*I.L.D.*

12L–325 551.509.318:551.524.37(492)

§Scharringa, M., **Oorzaak van de schade door nachtvorst in de nacht van 15 op 16 Juni 1956.** [Causes of frost damage on the night of June 15–16, 1956.] *Hemel en Dampkring*, The Hague, 54(10):186–190, Oct. 1956. 3 photos. **DWB, DLC**—The region subject to night frost embraced southeast Groningen, southeast Drenthe, east Friesland and northeast Overijssel. The synoptic situation over this area on June 15 are described and the atmospheric and ground conditions discussed under which night frost can occur and the night frost of June 15–16, 1956. *Subject Headings:* **1. Nocturnal frost 2. Frost damage 3. Synoptic conditions for frost 4. Netherlands.**—*I.L.D.*

12L–326 551.509.318:551.515.3(438)

Parczewski, Władysław and Kluźniak, Sylwia, **Traba powietrzna w województwie Szczecinskim w dniu 25 Sierpnia 1956 roku.** [The spout of Aug. 25, 1956 in the Szczecin district.] *Przeglad Geofizyczny*, Warsaw, 4(3):237–245, 1959. 7 figs., 8 refs. Russian and English summary p. 245. **DWB, DLC**—Analyzing the causes of exceptional intensification of the cold front related to a violently deepening cyclone and taking into account the results of local investigations, it is concluded that: the destructive spout of Aug. 25, 1956, generated at a cold front connected with an unusually active cyclone; the unusual activity of this cyclone was caused by considerable transgression of the critical value of temperature contrast in the lower troposphere layer;

maximum destruction (much greater than elsewhere) occurred only in places where the wir track narrowed, slightly widened or split, due to the exceptionally great increase in the rotar movement of the air column in such places; the mechanism of destruction showed such gre regularity that it was possible to indicate in advance with absolute certainty under what conc tions the destructive effects would attain catastrophic character. *Subject Headings:* **1. Synopt conditions for spout formation 2. Szczecin, Poland.**—*Authors' abstract.*

12L–327 551.509.318:551.524.37(497.

§Stanchev, K.; Sŭbev, L. and Stanev, Sv., **Silin zastudiavaniia nad Bŭlgariia pr studenata chast na godinata.** [Cases of severe freezing over Bulgaria during the cold part the year.] *Khidrologiia i Meteorologiia,* Sofia, No. 2:45–63, **1957.** 5 figs., 4 refs. Russian a English summaries p. 62–63. **DLC** (Slavic)—Five typical synoptic situations which have be associated with severe freezing conditions in Bulgaria (47 during 1945–1955) are shown schematic charts and discussed in detail. *Subject Headings:* **1. Synoptic conditions for freezi 2. Bulgaria.**—*G.T.*

12L–328 551.509.318:551.515(444.9

Striffling, M., **Quelques remarques sur la situation météorologique le 27 Aout 1955 da la région Lyonnaise.** [Some remarks on the Aug. 27, 1955 meteorological situation in the Ly region.] *Revue de Géographie de Lyon,* 31(1):61–64, 1956. **DWB**—A description of synoptic situation associated with the origin and cause of the storm is presented. Data barometric pressure and wind direction and velocity are given. Surface meteorological fact favoring the storm are analyzed. *Subject Headings:* **1. Synoptic conditions for storms Lyons, France.**—*I.L.D.*

12L–329 551.509.318:551.515.2(

Tanabe, S. [*comp.*], **On the relation between typhoon and weather trend.** *Journal Meteorological Research,* Tokyo, 10(4):336–349, April 1958. 27 figs. In Japanese. **DWB** Different effects of Typhoon No. 9, "Babs"; No. 11, "Dinah"; and No. 12, "Emma" dur Aug.–Sept. of 1956, on the weather conditions, are described as follows: "Babs" came thro Kyushu to the Sea of Japan, bringing to Japan as a whole, low temperature and bad weat "Dinah" came through the Sea of E. China to N. Korea, bringing bright, humid, hot weat "Emma" came through Kyushu to the Sea of Japan, with results similar to those of "Babs." author chose a large and small size typhoon, 1951–56, to compare these typhoons with previ reports made by others, and found little difference. *Subject Headings:* **1. Synoptic conditi for typhoons 2. Typhoons, Japan (Aug.–Sept. 1956) 3. Japan.**—*K.C.*

12L–330 551.509.318:551.524.37(4

§Vitvitskaia, Z. M., **Sinopticheskie usloviia vesennykh zamorozkov na Ukraine.** [Syn tic conditions of spring frosts in the Ukraine.] *Kiev, Ukraine. Nauchno-Issledovatel' Gidrometeorologicheskiĭ Institut,* Trudy, No. 7:196–215, **1957.** 7 figs., 2 tables, 6 refs. **DW** The character and peculiarities of the Ukrainian spring frosts are discussed. Most harmful fr which damage crops are analyzed in great detail. The character of atmospheric circulation and influence on the occurrence of frost is considered, and the number of frost days in spring is gi Advection, cold fronts and waves, and their influence on frost are investigated. All considerat are illustrated with schemes of synoptic processes and the table of recurrence of various type synoptic processes in time of frost. *Subject Headings:* **1. Spring frosts 2. Synoptic condit for spring frosts 3. Ukrainian S.S.R.**—*B.J.G.*

12L–331 551.509.318:551.515.8

Wang, S. D., **An analysis of the severe cold outbreaks over China.** *Meteorological B tin,* Taipei, Formosa, 4(4):15–22, Dec. **1958.** 9 figs., 3 refs. In Chinese; English sum p. 15. **DWB, DCL**?—The building-up of the Arctic polar cold air dome over north Chi usually characterized by the presence of a well-developed cyclone in Manchuria or the Yellow which is often induced by an upper low as described in this article. During the period of se cold outbreak, the upper polar westerlies usually moved down to low latitudes with the su cold air, which can be identified by the presence of the following phenomena over the are Taiwan: (a) double frontal inversion in troposphere; (b) strong winds—the socalled" Mid-Tr sphere Jet Stream" and (c) inclement weather. A synoptic study concerning these intruded westerlies has been discussed in some detail. In the presences of the severe cold outbreak weather would be bad all over China. In regions north of 35°N (north of Tsinling Shan) area of bad weather will shift eastward under the influence of westerly troughs and upper while south of 35°N the frontal activities will move southward due to the intrusion of

westerlies. A detailed discussion of cold air outbreaks was given in following topics: 1) The build up of the intense large polar anticyclones; 2) The initial mechanism for generating the cold outbreaks; 3) The Manchurian low in relation to the severe cold outbreaks; 4) The intrusion of upper polar westerlies into the regions of the South-Branch-Westerlies from Tibet plateau, and 5) Major cold outbreaks and weather. *Subject Headingsń* **1. Synoptic conditions for cold outbreaks 2. Cold air outbreaks 3. China.**—*Author's abstract.*

Weather and Circulation Types (551.509.318)

12L–332 551.509.318:551.577.3(437)

Bayer, Karel (*Geophys. Inst., d Tschechosl. Akad. d. Wiss, Abt. f Klimatologie, Prag.*), **Zur frage der geographischen Abgrenzung des Einflussbereiches typischer Wetterlagen.** [Geographical limitation of the influence of typical weather conditions.] *Studia Geophysica et Geodaetica,* Prague, 1(2):390–392, **1957.** fig., 4 refs. **DWB**—The geographical limit of the region of influence of a fall anticyclonic situation, the so called "old wives summer" of 1956. The method of Flohn for determining the region of influence of "old wives summer" involves calculating for individual stations, the ration of precipitation totals during this situation to the total expected precipitation assuming that precipitation was dstributed evenly during one month. The application of this method to summer of 1956 in Czechoslovakia is illustrated and its validity confirmed. *Subject Headings:* **1. Old wives summer 2. Precipitation distribution 3. Czechoslovakia.**—*Transl. of Russian abstract* (*I.L.D.*)

12L–333 551.509.318(7)

Clark, Edmund T. (*U. S. Navy*), **Objectivity in the classification of North American weather types. 1959.** Thesis (Ms. Sci. in Meteorology)—U. S. Naval Post-graduate School, Monterey, Calif. 25 p. 3 figs., 4 tables, 18 refs. Photostat of typescript. **DWB** (M09.318 C5920b)—An objective method of classifying the Elliott North American surface weather types is attempted. A dictionary of weather types is presented with each type defined in terms of 7 synoptic parameters. These parameters are as follows: 1) the 500 mb flow pattern; 2) the 500 mb ridge location; 3) the existence of a surface great basin anticyclone; 4) the existence of a surface great basin anticyclone 24 hrs. ago; 5) the existence of a surface Mackenzie river anticyclone; 6) the latitude of the 105th meridian crossing of the trajectory of cyclone centers, and 7) the existence of an area of relatively high pressure southwest of California. The classification is based on predominant recognizable flow features at the 500 mb level and the special and temporal features of the surface map. The method is capable of machine coding and presents a logical approach to rapid identification of a particular weather type in the North American west coast region. *Subject Headings:* **1. Weather type classification 2. North America.**—*Author's abstract.*

12L–334 551.509.318(478)

Fedorov, E. E., **Raspredelenie vazhneĭshikh tipov letneĭ progody na iugo-vostoke Evropeĭskoĭ Chasti SSSR.** [Distribution of the most important types of summer weather in the southeastern part of the Europeon U.S.S.R.] (In: Akademiia Nauk SSSR. Institut Geografii, **Sukhovei ikh proiskhozhdenie i bor'ba s nimi.** Moscow, **1957.** p. 7–19. 8 figs., 17 refs.) **DLC** (QC940.R9A6)—Results of a study of the recurrence of the most important weather types in the summer period (May–Sept.) carried out on the basis of observation data made at 17 meteorological stations of the southeast European U.S.S.R. during the period 1932–1946, are presented in graphs for each summer month and discussed. The main types of summer weather are: dry wind, drought weather, moderate drought, cloudy weather with or without rain. *Subject Headings:* **1. Weather types 2. Summer weather 3. Southeast European U.S.S.R.**—*A.M.P.*

12L–335 551.509.318(52)

Kudō, R., **On the annual weather variation in the light of classified pressure patterns.** *Journal of Meteorological Research,* Tokyo, 11(1): 23–27, Jan. **1959.** 4 figs., table, 3 refs., eqs. In Japanese; English summary p. 23. **DWB, DLC**—The pressure patterns from 1907–1956 with the use of daily rainfall amounts at Kochi are classified into 9 different types as follows: 0) typhoon passes through Shikoku or approaches near Shikoku; 1) rainy season; 2) north high and south low; 3) low or trough passes through Shikoku; 4) high displaces south from north; 5) traveling high; 6) west high and east low; 7) belt high, and 8) summer type. The "G" type indicates that one of the types 0 ~ 3 above mentioned persists over 4 days. *Subject Headings:* **1. Annual weather summaries 2. Weather type classification 3. Pressure pattern classification 4. Japan.**—*Author's summary.*

12L–336 551.509.3

Kurashima, A., **Investigation on the large-scale weather types, Pt. 1.** *Journal of Met orological Research,* Tokyo, 8(7):438–442, Aug. **1956.** 7 figs., 10 refs. In Japanese. [No by] M. Rirose and [Reply by] Kurashima, *Ibid.,* 9(1):64, March **1957. DWB, DLC**—T main point, in regard to representing weather types on a large scale weather chart, is to draw dynamic chart in which the real structure and movement of micro-synoptic processes over a lo period are characterized. A theory on the cold air tongue in the upper layer has been develop as shown in two figures giving its appearance, development, transformation and disappearan There is a general discussion of the fundamental bases of the position of westerly wind in relat to movement of the cold air tongue. The southward tendency of movement of the cold air tong in the upper layer has been classified into three types; middle, zonal and me type discussed in detail. The author has emphasized that there is a strong tendency for the th types to vary, particularly the meridional and zonal types. *Subject Heading:* **1. Weather ty comparisons.**—*K.C.*

12L–337 551.509.318:551.513:551.553.21

Kurashima, A., **Investigation on the broad-scale weather types, Pt. 2.** *Journal of Me orological Research,* Tokyo, 9(5):322–334, July **1957.** 12 figs., 9 refs. In Japanese; Engl summary p. 322. **Pt. 3,** in *Ibid.,* 9(12):853–859, Dec. **1957.** 10 figs., 2 tables, 5 refs. Japanese; English summary p. 853. **[Comment on Pt. 2]** by I. Goda, and **[Reply** Kurashima. *Ibid.,* 9(12):914–916, Dec. **1957. DWB, DLC**—In Pt. 2, Weather types in Far Eeast are studied on the basis of flow types or axes of movement of anticyclone (Multan skii's school) and composite charts derived from a series of analyzed synoptic charts. separation of an anticyclone into a warm and a cold portion is emphasized, also the Northwest monsoon type is distinguished from the northeasterly monsoon type and frequency histogram examples presented and discussed. In Pt. 3, two typical types of macrosynoptic processes o the eastern part of the Asiatic continent and the adjacent seas in cold half year are discuss the one is called the Northwesterly monsoon type, and the other is called the Northeasti monsoon type. In relation to those types the following phenomenon are considered: the posi and direction of the polar frontal zone over the southern half of Japan and its adjacent s difference of the movement of 500 mb cold tongue, main ridge line on 500 mb surface a 90°E and 60°E, the pattern of 500 mb height change from the Northwesterly to Northeast and its percentage frequency distribution of sign of height change and in its opposite cha and schematic representation of 500 mb flow pattern from Northwesterly to Northeasterly shown. In addition, the characteristics of the synoptic process of the two types for the pe of Jan.–March 1957 were discussed. *Subject Headings:* **1. Large scale weather types Macrosynoptic processes 3. Northwesterly monsoon type 4. Northeasterly monsoon 5. Eastern Asia.**—*M.R. and author's abstract.*

12L–338 551.509.318:523.746:551.513.1:551.57

Mishkarev, A. I., **Ob ispol'zovanii tipov tsirkuliatsii, chisel Vol'fa i indeksov tsirkuli dlia prognoza osadkov v Kazani.** [Using circulation types, Wolf numbers and circulation in to forecast precipitation in Kazan.] *Meteorologiia i Gidrologiia,* No. 12:26–28, Dec. **1959.** table, 3 refs. **DWB, DLC**—Statistical relations between different weather phenomena ca used for general consultation by various economic organizations. The study of certain periodi of the precipitation in one month or another is described with the aid of curves, a table an analysis of the characteristics of the circulation. An assumption is made that extreme chara istics of the meteorological elements during a month, season or year move from west to east. velocity of this movement is found to be about 500–700 km per year. On the basis of this ass tion a preliminary relation is established between the precipitation during the cold perio Moscow and one year later in Kazan. With this type of relation it is impossible to make p weather forecasts, however, it can be used for forecasting anomalies of certain elements, su precipitation and temperature. *Subject Headings:* **1. Precipitation forecasting 2. Circul types 3. Circulation indexes 4. Wolf numbers 5. Precipitation periodicities 6. K U.S.S.R.**—*N.P.S.*

12L–339 551.509.318:551.513:551.552/3(4

Préczely, György, **Áramlási viszonyok Magyarországon különböző makroszinop helyzetekben.** [Circulation conditions in Hungary during various large-scale synoptic situat *Időjárás,* Budapest, 61(6):408–419, Nov./Dec. **1957.** 4 figs., 3 tables, 4 refs. German sum p. 408. **DLC**—Prevailing surface wind directions and velocities in Hungary are determine various large scale synoptic situations. Five principal circulation types are established, which undergo characteristic changes due to orographic peculiarities of the Carpathian

Subject Headings: **1. Large scale circulation 2. Surface winds 3. Wind velocities 4. Circulation types 5. Hungary.**—*Transl. of author's abstract.*

12L–340 551.509.318:551.513:551.5515.73(47)

§Ponomarenko, I. N., **Sinopticheskie usloviia peremeshcheniia antitsiklonov po Ukraine i iugo-vostoku Evropeĭskoĭ chasti SSSR i ikh osnovnye pogodnye kharakteristiki.** [Synoptic conditions for the displacement of anticyclones in the Ukraine and the southeastern part of the European U.S.S.R. and their main meteorological characteristics.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 5:186–209, **1956.** 22 figs., table, 7 refs. **DWB, DLC**—The results of an analysis of anticyclonic trajectories made on the basis of factual data taken from synoptic charts for 1945–1952 show that depending on the direction of the leading stream in upper-level frontal zones and on their territorial distribution the trajectories of anticyclones moving over the European USSR can be classified into 4 groups and 10 kinds. Each group is associated with a specific circulation type, and each kind with a corresponding type of synoptic process. Seasonal changes of circulation types therefore, are the main cause of recurrent changes of anticyclones of different groups over the southern part of European U.S.S.R. Anticyclones of the NE and NW groups are predominant in winter, anticyclones of the western group prevail in spring and autumn, and SW anticyclones dominate in summer. Numerous charts and a table illustrate the study. *Subject Headings:* **1. Anticyclonic trajectories 2. Synoptic data 3. Seasonal changes of circulation types 4. Circulation types 5. European, U.S.S.R.**—*A.M.P.*

12L–341 551.509.318(521.418)

*Seshimo, S., **Classification of weather types at Aikawa.** *Journal of Meteorological Research,* Tokyo, 10(8):686–692, Aug. **1958.** 8 figs., 5 tables, 5 refs. eq. In Japanese. **DLC**—A careful study of forecasting of strong winds in Aikawa Prefecture made on the basis of H. Riehl's method which classified southerly and northerly trends by 12 patterns of variation of air current. H. Riehl's results were similar to those of the author's, based on variations of long wave and zonal index charts up to May 1952–57. High frequency of southerly trend is predominant in winter. From Nov. to March the basis for forecasting strong winds is 15 m/s and in other months 10 m/s. High frequency of occurrence and duration of strong wind in Dec. to Feb., and July and Aug. are least frequent. Three of four isobars between 134–144°E brought >10 m/s for maximum wind speed at the surface, and 5 or 6 isobars brought >15 m/s in this area. *Subject Headings:* **1. Weather type classification 2. Strong wind forecasting 3. Aikawa Prefecture, Japan.**—*Author's abstract.*

12L–342 551.509.318:551.515.3

§Kang, Y. C., **Cursory signs and associated phenomena of tornadoes.** *Meteorological Bulletin,* Taipei, Formosa, 1(2):15–23, June **1955.** 5 figs., 6 tables, 4 refs. In Chinese. **DLC** (Orientalia)—In order to trace the development of the tornado, which caused great damage in Makong, the capital city of Peng-hu Island (135E), at 5:10 p.m. on April 2, 1955, the author used the weather chart and the record of air observations. Factors such as relative humidity, temperature, air mass at the range up to 1000 mb and the cloud conditions were examined. The dew-point, relative humidity, and the instability of the cyclone were closely related to the formation of the tornado. *Subject Headings:* **1. Synoptic conditions for tornadoes 2. Peng-hu Island.**—*K.C.*

12L–343 551.509.318:551.515.4(477)

§Antonov, P. D. and Trunova, N. N., **Meteorologicheskaia i sinopticheskaia kharakteristika groz i ikh prognozirovanie v raione Chernovits.** [Meteorological and synoptic characteristics of thunderstorms and their forecasting in the region of Chernovtsy.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 12:57–68, **1958.** 3 figs., 12 tables, 5 refs. **DWB**—No investigation has been made of the peculiarity of thunderstorm activity in the regions located near mountain massives. The Chernovtsy airport is located in such an area. Analyses were made of such factors as: Mean numbers of days with thunderstorms in 1950–1955, the times of the beginning of thunderstorms, temperature of air at ground level, elasticity of water vapor; relative humidity of air at ground level, dew point, direction of wind, and vertical gradient of air temperature. Synoptic conditions of thunderstorm formation were also analyzed. The article concludes with the analyses of examples of thunderstorm formation in the airport region and the conditions during which cold fronts were not accompanied by thunderstorms. The article is illustrated with many tables and three synoptic maps. *Subject Headings:* **1. Thunderstorm forecasting 2. Synoptic conditions for thunderstorms 3. Chernovtsy Ukrainian S.S.R.**—*B.J.G.*

12L–344 551.509.318:551.553.8(479.

§Cherviachenko, V. A. and Ponomarenko, I. N., **Aerosinopticheskie usloviia shtormovykh vetrov v iugo-vostochnykh raionakh Severnogo Kavkaza.** [Aero-synoptic conditions of storm winds in the southeastern regions of northern Caucasus.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 7:167–182, **1957.** 6 figs., 4 tables, 5 refs. **DWB**—Forecast of storm winds in northern Caucasus is a very difficult task because of the influence of the local physico-geographic features. The regime of storm wind in that area has a multitude of specific characteristics. The present article is an attempt to indicate the basic conditions of the formation and development of storm winds in the area. The material for the analyses was: Aero-synoptic observations; data of Piatigorsk Meteorological Bureau and ten other meteorological stations, for the period of 1947–1950. The whole area is divided into four zones and each zone analyzed separately. Boundaries of zones are indicated. Basic data are tabulated. Aero-synoptic conditions for each of three groups of winds are analyzed. The groups of winds are formed according to the types of synoptic processes. A brief list of characteristics is given in the conclusion. The article is illustrated with tables, graphs and synoptic charts. *Subject Headings:* **1. Storm wind forecasting 2. Synoptic conditions for storm winds 3. Northern Caucasus.**—*B.J.G.*

12L–345 551.509.318:551.576.1

*§Sukhova, K. S., **Usloviia vozhiknoveniia nizhoĭ oblachnosti v raĭone Khabarovska.** [Conditions for the occurrence of low cloudiness in the Khabarovsk region.] *Dal'nevostochnyĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 7.46–73, 19 6 figs., 19 tables, 12 refs. **DWB**—The study is based upon daily weather data for the period 1949–1955, synoptic maps and pressure topography maps for the same period, emagrams, Khabarovsk for the period 1952–1956 and pibal observations at Khabarovsk during 1954–19 Low level cloudiness was defined as a cloud cover of 7–10 balls at a height of 300 m or above the surface of the earth; usually these clouds are of the stratus, strato-cumulus, bro stratus and broken cumulo nimbus type. The contents of this paper include the followi annual variation of the frequency of low level cloudiness; the frequency of low level cloudi as a function of synoptic condition; the relationship between low level cloud cover and h drizzle, rain, snow, and low level snow storms and the frequency of low level clouds cove the absence of these phenomena; the relationship of low cloud cover and horizontal visibility the surface of the earth; low level cloud cover and wind at the surface of the earth; low l cloud cover and degree of saturation of the atmosphere by water vapor at the surface of earth and in the atmospheric layer up to 1.5 km; stratification of lower layer of the atmosph at the moment of low level cloudiness; conditions of formation of low level cloudiness of w fronts, cold fronts, quasi-stationary fronts, occluded and secondary cloud fronts; conditions formation of intramass low level cloudiness; and analysis of individual instances of the forma of low frontal and intramass clouds. Extensive numerical data and numerous synoptic maps presented. *Subject Headings:* **1. Synoptic conditions for low clouds 2. Khabarovsk, Asi U.S.S.R**—*I.L.D.*

12L–346 551.509.318:551.577.2(729

Garstang, Michael, **Tropical island rainfall: a study of the rainfall distribution of Tr dad, West Indies.** *Woods Hole Oceanographic Institution, Mass., WHOI Contribution,* 1085, Oct. **1959.** 29 p. 7 figs., 3 tables, 19 refs. **DWB** (M77.2/729.85 G243tr)—The stud based upon the concept that climatology cannot be divorced from the dynamics of weather. attempt is made to outline the meteorological framework of the region of the tropics. The r fall of Trinidad is then discussed within this framework. The mean annual distribution of rai over the island forms a basis for the discussion of monthly distributions. Seasonal variatio pointed out and related to broad scale migrations of the subtropical anticyclones and the e torial trough. The dual rainfall maximum occurring during the wet season is, in turn, re to the synoptic scale patterns of this season. Distribution is then examined with reference t moist layer, wind direction and speed. Diurnal distribution is treated in detail and the me nisms giving rise to the well-defined distribution patterns are discussed. Finally, some atte is paid to shower amounts and distribution. In conclusion the rainfall of this island is marized by relating the seasonal variations to the broadscale meteorological background and actual distribution to the local scale influences. *Subject Headings:* **1. Rainfall distributio Synoptic conditions for tropical rainfall 3. Trinidad, West Indies.**—*Author's abstract.*

12L–347 551.509.318:551.579.4(282.2

Myers, Vance A., **Meteorology of hypothetical flood sequences in the Mississippi R Basin.** *U. S. Weather Bureau, Hydrometeorological Report,* No. 35, Dec. **1959.** 46 p. 25

footnotes. **DWB** (M77.37/73 U587h No. 35)—In the present report the Corps of Engineers, Department of Army have discussed meteorological aspects of hypothetical floods. It has been possible from the related contributions offered to adopt a basis for design in the Lower Mississippi River Basin. The program is described, and covers dimensional findings and conclusions on the precipitation characteristics of floods, the methods of estimating possible future floods, and the hypothetical flood sequence techniques during winter, spring and summer. Hypothetical map sequences illustrating the probable weather events are also included for each season. *Subject Headings:* **1. Flood sequences 2. Synoptic conditions for floods 3. Mississippi River Basin.**—*N.N.*

12L–348 551.509.318:551.571.36(429.7/9)

Oliver, J. (*Dept. of Geog., Univ. College of Swansea*), **Low humidities in upland South Wales, Jan. and Feb. 1959.** *Meteorological Magazine,* London, 88(1047):277–279, Oct. **1959. DWB, DLC**—Three instances of low humidity values as registered on Jan. 27, 1959, Feb. 9, 1959 and Feb. 17–19, 1959 by Casella thermohygrographs in the Craig Cerrig Gleisiad Nature Reserve (Breconshire) are reported. In the first case there were rapid oscillations of humidity between 40 and 60%, in the second, below 50% for 16 hours, and in the third below 30% with a six-hour spell below 20%. The synoptic situation during these times is also described. *Subject Headings:* **1. Synoptic conditions for low humidities 2. Low humidities 3. Breconshire, South Wales**—*I.S.*

12L–349 551.509.318:551.524.37:551.509.323.2

*Petrenko, V. K., **Vesennie i osennie zamorozki v Primorie.** [Autumn and spring freezes in the Maritime Territory.] *Dal'nevostochnyĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 6, pub. Leningrad, **1958.** p. 59–70. 5 figs., 5 tables, 4 refs. **DWB**—The climatic characteristics of freezes in Primorie (Maritime Territory) were studied on the basis of 10 years of data (1944–1953) for 28 meteorological stations. The period from April 16 to Oct. 20, i.e., the vegetation period was investigated and freezes in the atmosphere and the surface of the soil were studied. Freeze was defined as the lowering of air or soil surface temperature to 0°C or below while the mean daily temperatures were positive. The author discusses the climatic characteristics of spring and fall freezes in Primorie including the monthly mean frequency of atmospheric and soil freezes for each month from April–Oct., at each station; the dates of last spring and first fall freeze; the synoptic situations associated with the occurrence of spring and fall freezes; the establishment of synoptic types whose occurrence brings about freezes in Primorie; the probability of the synoptic types and of freezes, and the application of the formula of A. Mikhalevskiĭ for forecasting nocturnal radiation freezes from the 1300 hrs temperature, is illustrated and evaluated. For atmospheric freezes the formula is $M = T' - (T - T')\,C$ and for ground freezes it is $M' = T' - (T - T')\,2C$ where M and M' = expected minimum temperatures; T = dry bulb temperature at 13 hours; T' = wet bulb temperature at 1300 hrs and C = coefficient depending upon atmospheric humidity. It is shown that this formula with exact values of C can be used to forecast the sign (but not the absolute value) of the minimum atmospheric temperature in Primorie. However, the forecast made according to diurnal data must be rendered more accurate in the evening by taking into account the variations of the weather forecast. The formula of Mikhalevskiĭ cannot be used to forecast ground frost in Primorie. *Subject Headings:* **1. Synoptic conditions for frost 2. Ground frost forecasting 3. Primorie, Maritime Territory, Asiatic U.S.S.R.**—*I.L.D.*

12L–350 551.509.318:551.525.5(43–11)

Runge, H. (*Hauptwetterdienststelle Potsdam*), **Bodenfrost auch im Hochsommermonat Juli.** [Ground frost in July.] *Zeitschrift für Meteorologie,* Berlin, 13(1/6):314, Jan./June **1959.** 2 figs. **DWB, DLC**—The first ground frost observed in July since the beginning of meteorological observations in the area of the D.D.R. was verified in the region of Luchenwalde and of the Vogtland on July 26, 1958. Two meteorological charts illustrate the weather conditions of July 25th and 26, and the testimony of a gardener, observing the ground frost, is presented. *Subject Headings:* **1. Synoptic conditions for ground frost 2. Luchenwalde, East Germany.**—*O.T.*

FORECASTING OF SPECIFIC ELEMENTS AND PHENOMENA (551.509.32)

12L–351 551.509.32:551.557:551.524.7

§Chistiakov, A. D., **Prognoz temperatury i vetra v verkhnei troposfere i nizhneĭ stratosfere.** [Forecasting temperature and wind in the upper troposphere and lower stratosphere.] *Akademiia Nauk SSSR. Institut Fisiki Atmosfery, Trudy,* No. 2:160–166, **1958.** 2 figs., 6

tables, 6 eqs. **DLC** (Slavic)—A short range forecasting method in which the general form distribution of the meteorological elements with height is obtained by a simplified approxima integration along the horizontal. KIBEL's system of general equations for forecasting the variati of heights of isobaric surfaces, temperatures and vertical currents at any level of the atmosphe was solved by a numerical method in which the integral along P (pressure) entering the equ tion was represented as a trapezoid. Since at present, maps are constructed only for six lev of the atmosphere, the latter was divided into six layers, viz: 1000–850, 850–700, 700–500, 50 300, 300–200 and 200–0 mb. In the solution of this system of equations γ was chosen as variab with height. The formulas obtained as a result of the numerical solution are presented and t values of the coefficients are given in tables. Analysis of the equations led to the followi conclusions, viz: vertical motion at a given isobaric surface will be ascending if $A > 0$ in t atmospheric layers below a given surface and $A < 0$ above that surface; vertical motion will ascending also when in the lower lying surface of the atmosphere $A > 0$ and greater than in t upper lying atmospheric layers; rise in temperature as a result of advection, condensation, radi tion, etc., is accompanied by ascending motions and fall of temperature by descending motion hence, local variations of temperature are compensated partly by adiabatic cooling or warmi of air as a result of vertical motions produced by temperature changes; vertical motion depe not only upon temperature at the level of a given isobaric surface but also upon temperatu changes in other layers. Forecast maps of isobaric surfaces at 300 and 200 mb on Nov. 12, 19 are presented and compared with actual maps. *Subject Headings:* **1. Short range forecasti 2. Temperature forecasting 3. Wind forecasting.**—*I.L.D.*

12L–352 519.2:551.509.32:551.583.2(443.6

Frolow, V., **Aperçu sur l'évolution climatique à Paris jusqu'en l'an 2000.** [Survey the climatic evolution in Paris up to the year 2000.] *Association de Géographes Français, Pa Bulletin* No. 276/277:2–6, June/July **1958.** fig. **DLC**—H. and Y. LABROUSTE'S method analysis gives two techniques for elaborating forecasts of climatic evolution: a) extrapolation the elementary components, isolated out of the continuous series of data; b) evaluation of trend of reconnaissance curves which are reiterated slipping means. The reconnaissance cur show regularity in the general motions on graphs from the series of Paris. It is the ph persistence of periodical motions. The author arrives at the following prediction: from 1 onwards, decrease of temperature will continue during the third quarter of the 20th centu and slow the increase of annual rains which could still last for 30 to 40 yrs. Large and v large floods of the Seine are possible during the next 20 to 30 yrs. *Subject Headings:* **1. Lo range forecasting 2. Statistical forecasting 3. Paris, France.**—*A.V.*

WIND (551.509.322)

122–353 551.509.322:551.

*Blackader, Alfred K. and Reiter, Glenn C., **Objective forecasting of low-level wind sh** Pennsylvania. State Univ. Mineral Industries Experiment Station, Dept. of Meteorology, C tract AF 19(604)-2059, Scientific Report No. 1, July 31, **1958.** 28 p. 6 figs., 5 tables, 5 re eq. **DWB**—The highest frequency of large wind shear through the lowest 300 occurs in central Great Plains, where the frequency is similar in summer and winter. Elsewhere frequency is smaller and highest in winter. After a review of the physical causes of large w shear, an objective method of forecasting extreme values of shear at Tulsa, Okla., is develo Tests on an independent 9 month period yielded an over-all accuracy of 84% and a skill s of 59%. *Subject Headings:* **1. Wind shear forecasting 2. Wind shear 3. Tulsa, Okl** *Authors' abstract.*

12L–354 551.509.323.7:551.509.322:51

§Godart, O., **Interpolation verticale de variables météorologiques.** [Vertical interpola of meteorological variables.] *Belgium. Régie des Voies Aériennes. Service Météorologi Bulletin Trimestriel,* June/Aug. **1958,** p. 1–12 and Sept./Nov. **1958,** p. 1–20. figs., charts, tal eqs. Dutch, French and English summaries p. 1. **DWB**—A study is presented of the anal of discontinuity surfaces in the atmosphere from the point of view of wind and tempera interpolation. The vertical variation of the temperature between surfaces of discontinuity either fronts or tropopause can be approximated for practical purposes by a linear relation the logarithm of pressure. Accordingly the vector wind will vary between the same limits quadratic function of log p and the force of the wind, may reach a maximum at some in mediary level. When the layer 850 to 300 mb does not contain any surface of discontinuity, computation of parameters will be easily carried out. The problem becomes quite complex v along the vertical, several intervals with different parameters have to be considered. A mod envisaged where the transition zone between two air masses is pictured as an extension of

stratosphere, the fronts being the continuation towards levels of the tropopause. In the model under consideration, it is supposed that in the tropospheric air masses, the surface isotherms coincide with the surface isobars and that in the generalized stratosphere, including the frontal transition zone, the isotherms are vertical. It is shown by some examples that in general, the vertical sections may be analyzed according to the envisaged model. Topographic charts relating to the 300–850 mb layer with relating winds show the interest of this method for interpolation. These charts show the usefulness of giving the mean temperature gradient and consequently, a stability indication. *Subject Headings:* **1. Atmospheric models 2. Upper air wind analysis 3. Isobaric analysis 4. Legendre polynomials.**—*A.V. and author's abstract.*

12L–355 551.509.322:551.553.1(794)

Graham, Roderick D., **Effect of the Catalina Eddy on the summer wind at San Diego.** Los Angeles, Calif., U. S. Weather Bureau, Jan. 1955. 7 p. 10 figs., 6 refs. **DWB** (M09.322 U587ef)—The diurnal pattern of the surface wind at San Diego during summer is established for different surface pressure distributions, and time hodographs are presented to illustrate these conditions. One of the influences which perturb the normal wind pattern is the Catalina Eddy and the mean surface pressure distribution is determined for cases with strong eddies and for cases with weak eddies. *Subject Headings:* **1. Eddy effects on wind 2. Diurnal wind variations 3. Catalina Eddy 4. San Diego, Calif.**—*Author's abstract.*

12L–356 551.509.322:551.509.324(521.82)

Hamada, Japan. Weather Station, **The characteristics of wind and rain at Iwami District (western part of Shimane Prefecture).** *Journal of Meteorological Research,* Tokyo, 11(2): 101–119, Feb. 1959. 24 figs., 18 tables, 12 refs. In Japanese; English summary p. 101. **DWB**—Characteristics of the wind at Hamada and off Iwami district were investigated. In particular southwesterly wind is liable to blow strongly, and its speed on land is the same as that at sea, though the wind direction is much different, while the speed of northeasterly wind is larger at sea than over land. This is the standard in objective forecasting of wind at sea. Typhoon storms and winter monsoon were also examined and the results are available for daily forecasting. Further, the distribution of rainfall at Iwami district was investigated and it was found that there exist some local peculiarities which are very helpful to the forecast of heavy rain in Bai-u season and showers in winter. *Subject Headings:* **1. Heavy rain forecasting 2. Objective forecasting 3. Wind forecasting 4. Western Shimane Prefecture, Japan.**—*Author's abstract.*

12L–357 551.509.322:551.558

Shekhtman, E. D., **Ispol'zovanie dannykh vertikal'nogo zondirovaniia atmosfery d ia diagnoza i prognoza vertikal'nykh tokov.** [Use of vertical atmospheric sounding data for diagnosing and forecasting vertical currents.] *Alma-Ata, Kazakhstan. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 10:31–36, **1959.** fig., 5 refs., 22 eqs. **DWB**—A mathematical method is developed for determining vertical currents according to changes taking place in the humidity field which does not require complex calculations. *Subject Headings:* **1. Vertical current forecasting 2. Atmospheric sounding data 3. Alma-Ata, Kazakh S.S.R.**—*E.Z.S.*

12L–358 551.509.322:551.553.8

Simmonds, Thomas H., **A digest of objective methods for forecasting strong surface winds** (Southwestern United States—early spring). *U. S. Air Weather Service, AWS Technical Report,* 105–149, April 1959. 84 p. charts, forms. **DWB** (M(055) U58a)—Analysis of the Feb. March and April 1953–1957 data on gusty winds of 30 knots at 15 USAF airbases (Texas 7, New Mexico 4, Oklahoma 4) was conducted in order to develop objective forecast methods for each airbase. The scatter diagrams presented are explained for uses limited to surface wind. The value of the forecast method tested individually and by independent data show the range of correctness of the forecast as follows: 92% (1 time), 93% (3), 97% (2) and 98% (2). Whether or not the method is applicable elsewhere is unknown. *Subject Headings:* **1. Strong wind forecasting 2. Objective forecasting methods 3. Southwest United States.**—*W.N.*

12L–359 551.509.322

Simmonds, Thomas H., **Objective technique for forecasting strong and gusty surface winds at Carswell Air Force Base, Texas.** Wash., D. C., U. S. Air Weather Service, Nov. **1958.** 7 p. illus. (*U. S. Weather Service, AWS Study No. 7*) (Original unchecked) (ASTIA AD-208-237)—A technique is reported for forecasting strong surface winds with gusts of 30 knots or more at Carswell AFB, Texas, for a period of 12 to 28 hrs in the future. The procedure, analysis, forecasting variables, and limitations of the technique are the same as previously

reported (AD-203 210) except 2 scatter diagrams are used. Forecasting results show a sk score of 0.73 (92% correct). *Subject Headings:* **1. Objective forecasting 2. Wind forecastin 3. Carswell Air Force Base, Tex.**—*ASTIA abstract.*

Temperature (551.509.323)

See also: **Temperature prediction by dynamic methods** (Dubov, Stoliarova), 12L–199; **Surface temperature forecasts** (Klein et al.), 12L–236.

12L–360 551.509.323:551.524.

Bleck, G. (*Oldenburg*), **Zur Vorhersage der Tageshöchsttemperatur.** [Forecasting the da temperature maximum.] *Meteorologische Rundschau,* Berlin, 12(5):165–166, Sept./Oct. 19 2 figs., 4 refs. **DWB, DLC**—E. Gold's method of forecasting, developed and used in England described. It is a triangulation system. *Subject Heading:* **1. Maximum temperature foreca ing.**—*E.Z.S.*

12L–361 551.509.323:551.524.31:519.24(47,57

Isaev, E. A. and Afanas'eva, V. B., **Veroiatnost' otritsatel'noĭ sredneĭ sutochnoĭ tempe tury na Evropeĭskoĭ territorii SSSR i v Zapadnoĭ Sibiri v perekhodnye sezony.** [Probabil of mean daily temperature below freezing in the European U.S.S.R. and Western Siberia duri the transitional seasons.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 87:8 106, 1959. 8 figs., 7 tables, ref. **DLC**—This is presented in two sections, one for spring mon and the other one for fall months. It is based on mean daily temperatures for 26 stations European U.S.S.R. and Western Siberia. The stations selected, although inadequate in numb do serve to characterize the central and economically important area. This work attempts to sh the method of processing the data and the manner of computing the probability of occurrence certain meteorological elements. A separate set of tables, charts and graphs are provided for e of the two sections. The data included in this article is valuable when making forecasts of te perature anomalies and when evaluating forecasts from the point of view of probability. It m also be used as reference material by economic organizations and establishments. *Subject He ings:* **1. Daily mean temperatures 2. Temperature forecasting 3. Data processing 4. Eu pean U.S.S.R. 5. Western Siberia.**—*N.G.*

12L–362 551.509.323:551.52

Lawrence, E. N., **Forecasting grass minimum and soil temperatures under clear sk and light winds.** *Meteorological Magazine,* London, 89(1051):33–42, Feb. **1960.** 3 figs., ta 6 refs., eqs. **DWB, DLC**—An assessment is made of the relative importance of the influence air and soil moisture, and air and soil temperature on grass minimum temperature. It is c sidered that under radiation conditions (i.e., under clear or fairly clear skies and light win when minimum temperatures are liable to be lower than normal, more accurate forecasts of gr minimum temperature could be obtained by using both soil and air data than by using air d only. Some forecasting methods, using both soil and air data, are examined. The forecast of soil temperature is also considered. *Subject Headings:* **1. Temperature forecasting 2. S temperature forecasting 3. Grass minimum temperatures.**—*Author's summary.*

Cloud (551.509.324.1)

12L–363 551.509.32

Hoover, Robert A., (*W. B. Airport Station, Wash., D. C.*), **Forecasting advection stra during spring at Washington, D. C.** Manuscript prepared Aug. **1950.** 6 p. 2 tables, **DWB** (M09.39 U587fs)—May and June upper air wind and low cloudiness for Washing National Airport for 1942–50 were analyzed, with 1949 and 1950 data reserved for indepen test. Contingency tables were prepared for 1600 E, 1000 ft wind direction, (1000 ft–6000 veering or backing), and the temperature dew point difference at Atlantic City or Nor (depending on whether winds were north to east northeast or east-southwest). Advection str was rare if wind was west-southwest–north-northwest. Sea temperature and sunset dewp difference at Atlantic City and Norfolk were also tested but found to give less sharp segrega of points than did above. A similar study for Greensboro, N. C. (using relatively similar co stations) is included. Verification tables also are included. *Subject Headings:* **1. Object advection stratus forecasting 2. Stratus forecasting 3. Washington National Airport, W ington, D. C. 4. Greensboro, N. C.**—*M.R.*

12L–364 551.509.324.1:551.576.1:656.71(7

Jenrette, James J. (*Chanute Air Force Base, Illinois*), **Development of an objective met for forecasting Gulf stratus clouds at Bryan Air Base, Texas in the summer season.** *Amer*

Meteorological Society, Bulletin, 40(12):613–619, Dec. 1959. 4 figs., 2 tables, 9 refs. **DWB, DLC**—An objective method of forecasting Gulf stratus clouds at Bryan Air Base, Texas in the summer season is developed using the scatter-diagram technique. The parameters used are (1) resultant wind direction, (2) resultant pressure-gradient magnitude, (3) Houston temperature-dew-point spread, (4) Bryan dew point, and (5) Bryan temperature-dew-point spread. Based on one year of independent data and four years of dependent data, the skill scores are 0.55 and 0.77 respectively. *Subject Headings:* **1. Objective forecasting 2. Cloud forecasting 3. Bryan Air Base, Texas.**—*Author's abstract.*

12L–365 551.509.324.1

Meteorological Office discussion (on) Forecasting low cloud conditions at air fields. *Meteorological Magazine, London,* 87(1,031):151–157, May 1958. 4 refs. **DWB**—The discussions of Jan 1958 included **Frontal clouds** by C. P. Soppet; **Orographic clouds** by H. F. Holland, **North Sea stratus** by D. W. Johnston and **Non-frontal cloud in southwesterly airstreams** by T. Johnston. Each paper read was followed by brief discussion. Parts of each paper and of the discussion are reported here. *Subject Headings:* **1. Low cloud forecasting 2. Air field forecasts 3. Meteorological conferences.**—*W.N.*

Precipitation (551.509.324.2)

See also: **Forecasting rain** (Golubov), 12L–230.

12L–366 551.509.324.2:551.577.21:551.515.83

Bodolai, I., **Opyt kolichestvennogo prognoza osadkov pri prokhozhdenii kholodnogo fronta.** [An attempt to forecast precipitation quantitatively during the passage of a cold front.] *Meteorologiia i Gidrologiia,* No. 12:21–26, Dec. 1959. fig., table, 7 refs., 2 eqs. **DWB, DLC**—The quantitative forecast is made with the following considerations: 1) thermodynamic conditions of the atmosphere before the advancing cold front, and 2) two types of vertical movements, which cause considerable precipitation, one is created directly in the front and the second is stabilized vertical movement due to convergence. The first vertical movement is expressed with A. F. Dubuk's integral equation which is used in further computation. The process of computation of the precipitation is discussed in detail using numerical examples. The amount of precipitation around various European cities (Berlin, Munich, Vienna, Budapest, etc.) and the process of computation is presented in a table and discussed in the text. The results indicate that the amount of the precipitation, falling from a passing cold front depends on vertical movement, thermal development of the front, degree of saturation and air temperature. *Subject Headings:* **1. Quantitative precipitation forecasting 2. Vienna, Austria 3. Budapest, Hungary 4. Berlin, Germany 5. Munich, Germany.**—*N.P.S.*

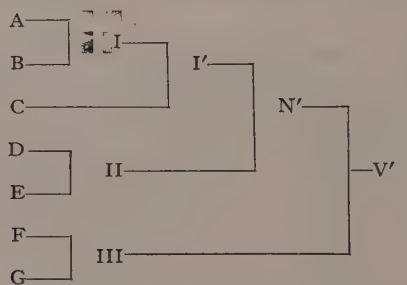
12L–367 551.509.324.2

Hiroshima, Japan. Meteorological Observatory, **A synoptic method of forecasting heavy rainfall.** *Journal of Meteorological Research, Tokyo,* 10(12):979–992, Dec. 1958. 13 figs., 2 tables, 34 refs. In Japanese; English summary, p. 979. **DWB, DLC**—Heavy rainfall is defined as one during which the amount of precipitation observed at any place in Chügoku district is above 100 mm/day. It is pointed out that such heavy rainfall is expected to occur in the following cases when: 1) warm side of a front faces temp. of about 14°C at 850 mb level, and of about −8°C at 500 mb level over Chügoku district; 2) westerly troughs approach this district and Pacific warm high extends northward; and 3) synoptic pattern over Chügoku district has some particular situations. Accordingly, it may be possible to forecast the heavy rainfall synoptically by the application of the above conditions. *Subject Headings:* **1. Heavy rainfall forecasting 2. Synoptic forecasting methods 3. Chügoku District, Japan.**—*Author's summary.*

12L–368 551.509.324.2

Maeda, I. and Kato, H., **An objective method of forecasting precipitation.** *Journal of Meteorological Research,* Tokyo, 11(3):195–205, March 1959. 17 figs., 3 tables, 3 refs. In Japanese; English summary p. 195–196. **DWB, DLC**—In many respects the vertical velocity, divergence, moisture, stability, vorticity and advective are the most important quantities that have to be considered in connection with precipitation forecasting. Of all the techniques used, a graphical correlation technique suggested by Brier is the most practical and suitable for forecasters at district weather stations having plentiful data and time for analysis. Generally this process involves the selection of a number of independent meteorological variables which are believed to be related to the weather element to be forecast. The general procedure is then to work with the variable in pairs, each set of two variables being plotted on a scatter diagram with the independent variables as coordinates and the values of the dependent variable indicated beside

each plotted point. Then the variables are combined into a single derived variable by constructin isograms which express the values of the plotted variate. The derived variables resulting fro each pair of original variables are again combined in pairs and the process is repeated until on one remains. This final derived variable is thus a function of all the original variables and m accordingly be used to give some information about the weather element desired to foreca We made use of this technique to forecast precip. at Nagoya using many variables (of upp levels) such as mentioned previously. The data used were taken from the "Aerological Data Japan" for the month of May, 1950–1956. Data for the same month of 1957 and 1958 we reserved to test the procedure as independent data. The forecast period used was the 12- interval beginning at the time of upper air observation. Numerous variables believed to be si nificant in forecasting rainfall at Nagoya were tested. Of the relationships tested, the followi 14 variables (in 7 pairs) produced the best results and were incorporated in the final forecasti method: 1) circulation variables: a. 700 mb wind direction at Shionomisaki, b. 700 mb wi direction and speed at Wajima (250 km north of Nagoya), c. 850 mb wind direction and spe at Shionomisaki (200 km southwest of Nagoya); 2) Moisture variables: d. 850 mb and 500 m mixing ratio at Shionomisaki; e. 700 mb mixing ratio at Shionomisaki and Wajima; 3) Si bility variables: f. temperature difference 700–500 mb and 500 mb humidity at Shionomisak and g. Temp. difference 850–700 mb and 700 mb humidity at Shionomisaki. Each 7 scatter di grams were analyzed by constructing isograms of rainfall amount and seven parameters w obtained. These seven parameters were then combined graphically according to the followi diagram:



It is concluded that by using the forecast procedure developed in this paper with the glance the synoptic situation, one can forecast precip. during the 12-hr period at Nagoya with a h degree of accuracy. *Subject Headings:* **1. Objective forecasting 2. Precipitation forecast 3. Nagoya, Japan.**—*Authors' summary.*

12L–369 551.509.3

Meteorological Office Discussion[on] Forecasting precipitation. *Meteorological Mo zine,* London, 87(1032):179–188, June **1958.** 4 figs., 4 refs. **DWB, DLC**—H. H. Lamb cussed conditions under which rain, sleet, snow or hail should be expected and C. E. Walling dealt with the problem of research in frontal rainfall. Brief comments from the particip followed. *Subject Headings:* **1. Precipitation forecasting 2. Frontal rainfall.**—*W.M.*

12L–370 551.509.324.2:551.57

†Liu, Hung-hsi, **Present status and future possibilities for quantitative precipitation fo casting.** *Meteorological Bulletin,* Taipei, Formosa, 5(1):10–14, **1959.** 25 refs. (refs. 14–23 p. 10) In Chinese; English summary p. 11. **DLC**—Water has always been an essential pro from ancient times until the present date. Nobody can live without water but water also m some troubles for us. So the qualitative weather forecasting in current use does satisfy increasing requirements of human beings; obviously, an accurate technique of quantitative cipitation forecasting is ultimately required. During the last 13 years, 1945–57, about 30 pa were contributed by American meteorologists and hydrometeorologists on the topic of quantit precipitation forecasting. The writer evaluates these papers and their future possibilities detailed reference is also attached. *Subject Heading:* **1. Quantitative precipitation forecas** —*Author's abstract.*

12L–371 551.509.324.2:551.577.21(52

Yamashita, H. and Sumino, M., **Forecasting of rainfall amount by cold front associ with upper high-latitude trough, taking the basin of river Kitakami as a model.** *Journ*

Meteorological Research, Tokyo, 11(3): 209–217, March 1959. 11 figs., 3 tables, 9 refs., 3 eqs. In Japanese; English summary p. 209. **DWB, DLC**—The authors based the forecasting of rainfall amount on the consideration of a cold front associated with upper high-latitude trough, taking the Basin of Kitakami River as a model. The rainfall amount during this storm is divided into some mechanisms and the amount of vapor to be condensed by each mechanism is calculated as follows: i) by the orographic upward motion: calculated by the method of vertical storage of vapor; ii) by the upslope motion of warm air along a cold frontal surface; calculated by the premigram using the vertical velocity of warm air; iii) by the release of convective instability; calculated by N. R. BEERS' slice method with some additional assumptions; iv) by the dynamical vertical velocity of synoptic scale; calculated by ESTOQUE's method. These amounts of vapor to be condensed are summed up from the forecasting point of view and the final amount of rainfall is obtained. The authors showed that the calculated rainfall amount nearly coincides with the observed one. The amount of vapor to be condensed, by the mixing at the frontal surface, is neglected owing to a smaller amount compared with (i), (ii) and (iii). *Subject Headings:* **1. Rainfall forecasting 2. Kitakami River basin, Japan.**—*Author's summary.*

VISIBILITY, MIST, FOG (551.509.325)

12L–372 551.509.325:551.575.36(521.71)

*Kido, T., **On the dense fog at Ueno, Pt. 2.** *Journal of Meteorological Research,* Tokyo, 7(11):748–750, Dec. **1955.** 3 figs., 3 tables. In Japanese. **DWB, DLC**—Statistical study of fog frequencies of Ueno based on upper air wind, direction frequencies at Kameyama and wind speeds at Osake and Kameyama. *Subject Headings:* **1. Objective fog forecasting 2. Fog frequencies 3. Ueno, Japan.**—*M.R.*

12L–373 551.509.324:551.575(75)

U. S. Air Weather Service, **An area forecasting study for the Southeastern United States.** Its *AWS Technical Report,* No. 105-82, Nov. 1951. 52. p. 32 figs., 13 refs. Reproduced from typescript. **DWB** (M(055) U58a)—A synoptic case history study of conditions favorable for low ceilings or fog (air mass, stratus, advection and radiation fog) in the Southeastern States. Many statistical (objective) aids are included, as well as typical actual or schematic synoptic charts for each type, rules for forecasting, etc. Conditions are defined as critical if an area 300 mi diameter has a ceiling < 1000 ft. *Subject Headings:* **1. Synoptic conditions for fog 2. Fog forecasting 3. Southeastern United States.**—*M.R.*

THUNDERSTORMS (551.509.326)

12L–374 551.509.326:551.515.4

Ardis, Colby V., Jr., **An objective method for forecasting thunderstorms at Truax Field, Madison, Wisconsin. 1959.** 50 p. figs., 6 tables, 3 refs. Thesis (M.Sc)—Wisconsin Univ. **DWB** (M09.326 A676ob)—The forecast problem is studied for the occurrence of thunderstorms during the summer months, June, July and Aug. valid for a 24 hour period beginning at 1200 Z. The upper air (radiosonde) and surface synoptic data (excepting times of occurrence) for each month for the years 1949–1951 were obtained and developed. The month of Aug. was used for the pilot study with reference to results obtained and the operational use of the proposed system. It is concluded that the system does work and that it will be a useful tool for the forecaster. *Subject Headings:* **1. Objective forecasting methods 2. Thunderstorm forecasting 3. Synoptic data 4. Madison, Wisc.**—*I.S.*

12L–375 551.509.326:551.515.4

Bailey, R. E., **Local thunderstorm forecasting.** (In: Visscher, H. B. et al., **Development of practical, short-range, weather prediction techniques.** Atlanta, Georgia, Eastern Air Lines, Dec. **1955.** p. 51–61. 5 figs., table.) **DWB**—The problem of forecasting local thunderstorms which are not associated with fronts or line squalls is investigated and a method for predicting them on the basis of radiosonde data is devised. Wind shear is used to eliminate some negative areas. A graph of a typical thunderstorm sounding shows, how stability and moisture amounts are obtained for forecasting. An example of anticyclonic shear and curvature at 850 mb preventing thunderstorms is given. A table gives data showing daily 0300Z soundings and the following day's weather: A forecast work-sheet is appended. *Subject Headings:* **1. Short range forecasting 2. Thunderstorm forecasting.**—*E.Z.S.*

12L–376 551.509.326:551.511.1:551.515.4

Chu, K. C., **A method of thunderstorm forecasting.** *Meteorological Bulletin,* Taipei, Formosa, 3(1):12–14, March **1957.** 6 figs., 7 refs. In Chinese. **DLC** (Orientalia)—A method

for obtaining a stability index from the formation of area stability charts in the 500 mb–850 range. This article is a condensation of the original, published by A. K. Showalter in *American Meteorological Society Bulletin,* issued in 1953 (*See* 6.7–148, July 1955, *Met. Ab* under the title **A stability index for thunderstorm forecasting.** Comparative study was o lined referring to the previous work of SCHERHAF and GARDNER but SHOWALTER's method w found to be most dependable. *Subject Headings:* **1. Thunderstorm forecasting 2. Showalte Stability Index.**—*K.C.*

12L–377 551.509.

Muchnik, V. M., **Nekotorye voprosy prognozirovaniia livnei i groz.** [Some problems shower and thunderstorm forecasting.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrom orologicheskiĭ, Trudy,* No. 7:72–74, 1957. 4 tables, 2 refs. **DWB**—The article considers the ch acteristics of forecasting of showers for a given locality and the dry (rainless) thunderstor In the first part, the question of 100% correct forecasting for the next day, and the area which such a forecast may be correct, are considered and illustrated with tables indicating number of meteorological stations in the areas of various radii, and the number of days w showers within the areas of various radii. Two tables are for the vicinity of Kiev. A th table indicates the intensity of the showers. Dry (rainless) thunderstorms are discussed n Another table shows the percentage of rainless thunderstorms. The following deductions made: 1) correctness of forecast should not be expected for the areas of radius greater t 30 km; 2) thunderstorms are usually accompanied by showers. Rainless thunderstorms in tudes of considered localities are rare. *Subject Headings:* **1. Shower forecasting probl 2. Thunderstorm forecasting 3. Kiev, Ukrainian S.S.R.**—*B.J.G.*

12L–378 551.509.326(521.84):551.586:6

Ōe, T., **On the forecasting of rain shower during the season of rush harvest in Matsun region.** *Journal of Meteorological Research,* Tokyo, 10(11):905–910, Nov. **1958.** 5 figs., ta 4 refs. In Japanese; English summary, p. 905. **DWB, DLC**—The period of rush harves the vicinity of Matsunaga normally ranges from 10th to 25th, July, and it is necessary for making that fine weather continues more than at least 3 days during the period. Forecas therefore, important for the rush harvest and eventually to forecast the rain shower which ca heavy damage to the rush. It is shown in this paper that the period favorable for the rush har after the ending of Bai-u or during the recess time of Bai-u, is related to the area of pos deviation from normal in 500 mb contour chart. The rain shower during the period is mainly to thunderstorms over the whole area of Chūgoka or Sanyō district, and may be predicted on basis of the appearance of vertical instability and sudden fall of upper air temperature at Yo and the appearance of cold front and horizontal instability at 850 mb level. *Subject Headi* **1. Thunderstorm forecasting 2. Rain shower forecasting 3. Matsunaga, Japan.**—*Aut summary.*

12L–379 551.515.4:551.509.326(521.

§Sugiura, S., **Analysis of the thunderstorm in the Kantō-Kōshin district on June 14,** *Journal of Meteorological Research,* Tokyo, 12(3):163–168, March **1960.** 8 figs., table, 3 In Japanese. **DWB, DLC**—With the use of a thunderstorm chart (1/2,000,000) and self-re ing charts of wind direction and speed, air temperature, rainfall amount and humidity obt from Tokyo stations and Fukuoka Prefecture, the analysis of the thunderstorm was made due consideration of orographic effects. The discussions and illustrations include an h adiabatic chart, extension of air pressure base, the cause of thunderstorm and precipitation, radar-eco conditions. The conclusions are: 1) there was a migratory small scale cyclo Kanto district; and 2) there were influenced orographic effects. The possibility of foreca thunderstorms was explained. *Subject Headings:* **1. Thunderstorm analysis 2. Thunders forecasting 3. Kanto-Koshin, Japan.**—*K.C.*

TROPICAL CYCLONES, HURRICANES, TYPHOONS AND TORNADOES (551.509.327)

See also: **Forecast on movement of Typhoon Grace** (Laio), 12L–201; **Long range forecast of typhoon** (Kikuta), 12L–234; **Forecasting movement of typhoon** (Shibayama), 12L–250; **Prediction of typhoon tracks** (Tung), 12L–251.

12L–380 551.509.327:551.5

Birchfield, Gene E. (*Univ. of Chicago*), **Further studies of barotropic numerical pr tion of hurricane movement with the use of a fine grid.** Chicago. University Dept. of orology, Contract Cwb-9227, Technical Report No. 8, Dec. **1958.** 9 p. 9 figs., 2 tables, 2 **DWB** (M15.2 C532te)— A summary of hurricane forecasts made with the fine-grid num

model is given. Twenty-four and 48-hr 500 mb predictions for "Connie" and "Diane" (1955) and "Betsy" (1956) are presented. The accuracy of the predicted tracks is compared with that of other numerical models. *Subject Headings:* **1. Numerical forecasting 2. Hurricane forecasting.**—*Author's abstract.*

12L–381 550.342:551.465:532.59:551.509.327

Iyer, H. M. and Darbyshire, J. (*both, Nat'l. Inst. of Oceanog.*), **Study of microseisms for storm forecasting.** *New Scientist,* 3(69):16–18, 1958. 2 figs., table. **DLC**—Reprinted as *National Institute of Oceanography, Wormley, Surrey, England, Collected Reprints,* 6(215), Dec. 1958. **DWB**—A brief review of theories leading to the use of microseisms for storm forecasting. Studies are in progress at the National Institute of Oceanography to determine the relationship between sea waves and microseisms to establish a reliable scheme of using this information for meteorological and oceanographic purposes. A new electronic seismograph recorded all major storms last winter, even those more than 1,000 mi distant. *Subject Headings:* **1. Storm forecasting 2. Microseisms—storm relationships 3. Sea wave—microseismic relationships.**—*E.Z.S.*

12L–382 551.509.327:551.551.3(73)

Farthing, E. D., **[Report on Symposium and Indoctrination Course in Severe Weather Forecasting, Dec. 15–17, 1953, Tiner Field, Oklahoma.]** *Trans World Airlines, Kansas City, Meteorological Technical Bulletin,* No. 53-2, Dec. 30, 1953. 4 p. table. **DWB**—An account of symposium and examples of 3 basic types of tornadoes which occur in the U. S. together with characteristics of synoptic situation preceding each type (which may be used as aids to forecasting) are summarized and tabulated. *Subject Headings:* **1. Tornado types 2. Tornado forecasting 3. Synoptic conditions for tornadoes 4. United States.**—*M.R.*

12L–383 551.553.6(573):551.509.327

*§Kursanova, I. A., **O vetrovom rezhime na Kamchatke.** [Wind regime over Kamchatka.] *Dal'nevostochnyĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 7:107–137, 1959. 10 figs., 4 tables, charts, 7 refs. **DWB**—A comprehensive analysis of the wind regime along the coasts of Kamchatka and the formation of forecast indications to predict storms and hurricanes. The wind regime is comprised of winds of 7 balls or greater. The study is based upon data from 8 stations in western Kamchatka and 12 stations in eastern Kamchatka. The contents, comprise the following: frequency of wind direction and wind of different forces by place and month, duration of storm and hurricane winds and synoptic conditions of storm winds on Kamchatka. The most intense storm wind regions were found to occur in the extreme south of Kamchatka and the nearby areas of the western and eastern coasts. The prevailing direction of strong winds was the northerly quarter. The maximum frequency of strong winds was in the cold half year. The duration of storms in the south of Kamchatka (Cape Lopatke) was 3 days and of hurricanes—slightly more than a day. Storm winds are produced by deep cyclones passing near Kamchatka. All the trajectories of cyclones were divided into 8 groups each of which differs with respect to depth of the cyclones, speed of movement and interdiurnal variation of the 500 mb heights. Maps showing distribution of wind roses in Jan. and July and trajectories of cyclones, synoptic maps for specific cyclonic developments and tables giving mean and maximum number of days with wind exceeding 5 balls and for 7, 10, and 12 balls, duration of storm winds and hurricanes for 1949–1953, frequency of winds of 7 balls and greater according to wind direction (1949–1953) etc. are presented. *Subject Headings:* **1. Wind regime 2. Storm forecasting 3. Hurricane forecasting 4 Kamchatka, Asiatic U.S.S.R.**—*I.L.D. and author's summary.*

12L–384 551.509.327:551.509.318

Miller, Robert C. (*United States Air Force*), **Tornado-producing synoptic patterns.** *American Meteorological Society, Bulletin,* 40(9):465–472, Sept. 1959. 5 figs., 7 refs. **DWB, DLC**—Three basic Fawbush-Miller tornado-forecast rules are discussed in the light of experience gained during nine years operation of the USAF Severe Weather Warning Center. These three rules are then related to five tornado-producing synoptic patterns and the suggestion made that the latter are suitable to severe as a basic for an analog system. The discussion is sufficiently detailed to be of operational value to the field forecaster. *Subject Headings:* **1. Tornado forecasting 2. Synoptic conditions for tornadoes.**—*Author's abstract.*

12L–385 551.509.327:551.515.2

Moline, Juan (*Dir. Nat. Met. Service, Dominican Repub.*), **Necessity of more knowledge on hurricanes and protection against their disastrous effects.** (In: Caribbean Hurricane Seminar, Ciudad Trujillo, Feb. 1956, **Final Report of the Seminar,** pub. 1956. p. 5–8) **DWB**—The Technical Assistance Programme of the U. S. and the W. M. O. together have helped train per-

sonnel and provide equipment for improved studies of hurricanes. The public is being advi and construction engineers are providing for a more general appreciation of the problems invo in precautionary measures in a common effort to forecast and protect a country from dam caused by hurricanes. *Subject Headings:* **1. Hurricane forecasting 2. Hurricane damage vention.**—*E.Z.S.*

12L–386 551.509.327:551.51

U. S. Weather Bureau, **Quantitative prediction of 36-hour hurricane movement. A liminary report on its National Hurricane Research Project.** West Palm Beach, Flo May 11, 1957. 26 p. 16 figs., eqs. **DWB** (M15.23 U585qu)—The report concerns work laun at the National Hurricane Research Project Research Operation Base, West Palm Beach, and informs of the development of a quantitative prediction technique of hurricane movement 18 and 36 hrs in advance. Most of the work was accomplished during the period April 23– 11, 1957. The procedures used and the results obtained from each facet of the investigation given in detail. The results are tabulated and numerous graphs included to illustrate va phases of the investigation. A list is also given of procedures recommended for experim use of the method. Further refinement and development of the method is expected to cont at the Hurricane Forecast Centers as well as at the Research Operations Base. *Subject Head* **1. Hurricane track forecasting 2. National Hurricane Research Project Research O tion Base, West Palm Beach, Fla.**—*I.S.*

12L–387 551.509.327:551.5

Vanderman, Lloyd W. (*U. S. Air Force*), **Hurricane forecasting.** *U. S. Joint Numa Weather Prediction Unit, Technical Memorandum,* No. 16, Aug. 20, **1959.** 5 p. 8 figs., **DWB** (M09.312 U583t)—From studies of hurricane forecasts made prior to 1958 a much reliable method of forecasting hurricanes has been developed. Forecasts for 1958 hurri using this method of analysis and trajectory computation have produced better results than other method. It is similar to the one employed by a synoptic forecaster but there is an adva of integrating over hourly time steps rather than over 24 or 36 hr time steps. *Subject Hea* **1. Hurricane forecasting.**—*N.N.*

Other Elements and Phenomena (551.509.329)

See also: **Wave reporting** (Shinners), 12L–42, **Atmospheric pressure field** (Nemchinov), 12L–159; **Forecasting of pressure fields** (Belov), 12L–196; **Solutions of equations for variations in geopotential** (Dobryshman), 12L–217; **Short range forecasting pressure fields** (Kogan), 12L–219; **Statistical prediction of 500 mb contour** (Ozawa), 12L–222; **Empirical method of forecasting** (George et al), 12L–229; *Also see* 12L–(568–609).

12L–388 551.509.329:551.579.4:55

Bazhnov, A. N., **Prognozy vesenne-letnego stoka rek Zakavkaz'ia.** [Forecasts o spring-summer discharge of Trans-Caucasian rivers.] *Moscow. Tsentral'nyĭ Institut Prog Trudy,* No. 67:118–140, **1958.** 12 figs., 8 tables, 2 refs., 2 eqs. **DWB**—Since for the v rivers of the Trans-Caucasian winter precipitation varies from 15 to 60% of the total precipi responsible for river flow and precipitation amounts to 30 to 60% of the total flow during water, the forecasting of flood water differs from region to region. The general metho forecasting flow during flood water and the equations used when either snow surveys o gages are used to measure river supplies, the characteristics of the variables of snow su spring and summer precipitation, total precipitation during the cold period, and magnitu precipitation during thawing with special reference to the Aragva River are discussed. the density of the raingage network is 1/250–350 km² the mean snow supply in the basin computed with an error no more than 8–12%. The snow supply is computed with the curves of variation of seasonal precipitation totals, with the height of the point observed a hypsographic curve of the catchment basin. In the case of basins a considerable part of is situated in the zone of unstable snow cover, the characteristics of snow reserve ex during thawing must be introduced into the correlation of flow with snow supplies; this acteristic may be regarded as the sum of positive temperatures during winter or the ru winter floods. If the winter precipitation, taken into account during a forecast, amounts t than 50–60% of the total amount of precipitation forming flood waters, then the long rang forecast can be made without including the precipitation during the flood period. Forec monthly runoff during flood periods for April, May and June are presented. *Subject He* **1. River forecasting 2. River discharges 3. Flood forecasting 4. Trans-Caucasian U.S.S.R.**—*I.L.D.*

12L–389 551.509.329:551.326.83:551.482.2(282.247.4)

Bulatov, S. N., **Vliianie zimneĭ vodnosti na ledovyĭ rezhim i vskrytie rek.** [Influence of winter water content on the ice regime and the breakup of rivers.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, No. 62:72–99, **1957.** 13 figs., 3 tables, 48 refs., 20 eqs. **DLC**—The history of studies in ice forecasts in Russian rivers since 1886 is reviewed briefly, special attention being given to the method of short range forecasting of ice phenomena on rivers such as the heat balance method for determining ice break up, etc. This is followed by analysis of the interrelationship between winter water content and winter ice regime and its use in forecasting the time of ice break up. The influence of heat inflow into rivers from underground water, transformation of mechanical energy into heat as a function of current velocity at the under surface of the ice, ice formation in the river channel, effect of snow upon the ice surface, upon the growth of river ice, is analyzed. It was found that the growth of ice on rivers depends, not only upon meteorological conditions of air temperature, snow depth, etc., but also upon the degree of ice sludge in the channel and the inflow of underground water. The amount of sludge may be expressed by the coefficient of roughness of the lower surface of the ice, n_e, namely $n_e = n_p\left[\left(\frac{1}{k}\right)^{\frac{4}{3}} - 1\right]^{\frac{1}{4}}$ where $k = \frac{n_r}{n_{p2}}$; n_r = roughness coefficient of the channel; n_{p2} = roughness coefficient for the current under the ice cover. For the local characteristics the sludginess of the channel, the height of the water level at the beginning of ice melting can be used. In some cases the best characteristic is mean water level or the maximum level during the melting period. The water level also describes indirectly the inflow of heat into the current from underground waters. The relationship of winter water content of rivers to the roughness coefficient of the under ice surface and ice thickness during the growth of the ice cover over rivers and spring thawing is analyzed. The usefulness of winter water levels on short range and long range forecasting is discussed. The analysis is based upon data for the Volga River. *Subject Headings:* **1. River ice breakup 2. River ice forecasting 3 Winter water levels 4. Volga River, U.S.S.R.**—*I.L.D.*

12L–390 551.509.329:551.579.1(714)

Cavadias, George S., **An approach to forecasting the spring run-off in Quebec.** *Western Snow Conference, April 1958, Proceedings*, 26:35–45, Oct. **1958.** 7 figs., 4 refs. **DWB** (M(06) W527p)—The report describes the same approach to the problem of forecasting spring runoff as successfully tested upon in the Gouin reservoir in Quebec. The reservoir has a capacity of 6.5 million acre feet that regulates the flow for the seven plants of the St. Maurice River hydro system. *Subject Headings:* **1. Runoff forecasting 2. Hydroelectric power 3. Quebec.**—*N.N.*

12L–391 551.509.329:551.579.4:551.482

Chizhov, O. P., **Opyt razrabotki sposobov prognoza vysokikh zimnikh urovneĭ Amu-Dar'i v ee nizhnem techenii.** [Experiment on the analysis of methods of forecasting water levels in the lower reaches of the Amu Darya River.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy*, No. 48(75):72–95, **1956.** 6 figs., 4 tables, 21 refs., 3 eqs. **DLC**—Various studies were made on the freezing of large rivers, in which the formation of the ice edge proceeds by way of the movement of the ice edge upward along the current. These studies include the work of V. M. Lophtin (1906) on the relationship between the freeze-up of large rivers and the nature of their longitudinal profile; the formation of underwater ice and ice obstacles at points of sudden changes in the slope of the water surface; rate of movement of the ice edge and elevation of water surface at the edge; spring ice obstruction during river ice break up, etc. The water levels of the Amu Darya and Syr Darya rise sharply with the narrowing of the channel and the accumulation of underwater ice below the surface during freezing as a result of the continued ice formation above the ice edge and in unfrozen water patches. The formation of the ice edge is closely associated with air temperature; the curve of the movement of the ice edge with temperature has the form of a cubic parabola with an inflexion at $t = -4°C$ with upward movement of the ice edge the water level also rises. The greatest ice obstruction rise in water level observed during the passage of the ice edge at a given point is inversely related to the velocity of the ice edge. Furthermore the rise in level is influenced by water content of the river; with increased water content the thickness of underwater ice and the distance between accumulations is greater. By means of forecasts of air temperature and freezing dates, the observed prewinter water level before underwater ice formations and water discharge it is possible to determine the maximum expected water level. The variation of water level under the ice cover indicates that the rise of water level under a stable ice cover varies inversely with the maximum water level at the beginning of ice formation. Finally, the ice obstructed level of water during ice break-up and its forecasting is analyzed in relation to the recession rate of the ice edge, degree of development of blocking phenomena at the ice edge, form of river channels and the distance of the point of observation on water level from the point of ice blocking formation. *Subject Headings:* **1. River level forecasting 2. Underwater ice formation 3. Freezing of rivers 4. Amu Darya River, Kazakh, U.S.S.R.**—*I.L.D.*

12L–392 551.509.329:551.509.317:551.5

Drogaĭtsev, D. A., **Prognozy godovogo stoka rek.** [Annual river runoff forecast *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 5:10–20, Sept./Oct. **1958.** 5 figs., table, 7 r eqs. **DWB**—Since the total annual flow of both plain and mountain rivers depends prim upon amount of rainfall and atmospheric temperature, the cause of the variability of the an flow of rivers must be sought in the fluctuations of the atmospheric circulation about its nc condition. The forecasting of annual river flow is analogous to the method of long rang forecasts in Arctic Seas developed by V. Iu. Vize. The long period fluctuation of the atmosp temperature field is investigated by using maps of relative topography of the isobaric 500 surface over the 1000 mb surface (AT500/1000). In the case of interannual temperature v tions within a single season the principal factor controlling long period temperature fluctuati advection of heat (cold) and the associated condensation-evaporation of moisture. The vari of AT500/1000 with time fully reflects the transport of latent heat and almost fully the v heat. The fluctuation of the atmospheric temperature field from one pre-winter to the follo (pre-winter Oct. 1–Dec. 31) is investigated by qualitative and quantitative methods. In the of the former it is shown that the anomalies of precipitation and river flow during the year lowing a pre-winter period are associated with the position of centers of heat with ridge centers of cold with troughs. And this relationship underlies the long range forecastin annual flow and volume of spring floods. In the quantitative method the characteristics o atmospheric temperature field are represented by the semitotal of heat and cold indices mean maximum anomaly AT500/1000 is the heat index and the mean minimum is the cold in The relationship between the volume of spring floods and atmospheric temperature field in Examples showing how river flow anomalies opposite in sign are a consequence of opposite tematic advection of heat. The pre-winter determination of favorable flow possibilities d the approaching year is given by the number $N = K\text{-}L$ representing the difference between totals of heat and cold indices taken anywhere southeast from the basin (K) and northeast: (L). The application of this procedure relating total river flow and volume of spring flo semitotal indices of heat and cold in the preceding winter for the Dnieper, Don Danube, Ob' and Irtysh Rivers is presented and data, connection coefficients and regression equations ing flow and indices are given. *Subject Headings:* **1. River runoff forecasting 2. Tem ture-runoff relationships.**—*I.L.D.*

12L–393 551.326.83:551.509.329(282.

Efremova, N. D., **Zavisimost' intensivnosti osennego ledokhoda na rekakh ot gidrc orologicheskikh uslovii.** [Dependence of the intensity of ice flow on rivers in fall upon meteorological conditions.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 65:15 **1958.** 4 figs., 5 tables, 10 refs. **DLC**—The author develops a method for computing the tion of the intensity of ice drift during fall ice formation in order to make short range for The study is based upon observations along the Volga River, Oka and Kama Rivers period of 14 yrs. The thickness of drifting ice depends upon the sum of negative air tempe and velocity of ice flow. By graphic analysis there is obtained the relationship $h_i = f(\Sigma t$ where $\Sigma t_- =$ sum of negative temperatures and $v =$ mean velocity of current on the d appeared in section examined. On the basis of observations on the density of ice drift (medium, dense) a relationship of the form $\Sigma(t) = (v_m)$ was obtained for computing the d change in the phase of ice drift on the Volga, Kama and Oka Rivers. Local relationships o for different sections of rivers, but for the same density of ice drift, are in practice combi Computed relationships, both local and general, obtained for regulated and non-regulated of rivers are sufficiently accurate and can be used to forecast the date on which the ic phase changes. Approximate calculations of the growth in thickness of ice and in melt drift ice by the heat balance method agreed satisfactorily with actual observations. *Subject ings:* **1. Ice drift intensity variations 2. Ice drift forecasting 3. Volga River, U.S.S Oka River, U.S.S.R. 5. Kama River, U.S.S.R.**—*I.L.D.*

12L–394 551.509.329:55

Epshtein, A. I., **Metodika kratkosrochnogo prognoza naĭvysshikh urovneĭ vesennego pol i dat ikh nastupleniia na primere r. Seim.** [Method of short range forecasting maximum flood levels and their date of occurrence taking the Seim River as an example.] *Moscow. tral'nyĭ Institut Prognozov, Trudy,* No. 44(71):49–58, **1956.** 3 figs., 5 tables, 4 refs., eqs. **D** method of forecasting maximum levels of spring floods by taking into account not only th yield in a basin (amount of water reaching a basin as a result of snow melt and fluid precip but also the amount of water retained and sometimes lost by the river basin during sno The method of forecasting the spring floods of the Seim River at Roikovo from water yields periods 1928–1939 and 1943–1954 is described. The daily yield of water in the basin was co

y the formula $h = h_t p + h_d$ (where h_t = layer of snow melting during 24 hrs determined by means f the nomogram of L. G. SHULIAKOVSKII, p = percent of basin covered with snow, h_d = daily fluid recipitation averaged for the basin in mm). The equation for calculating the sum of maximum ield and yield for several preceding days (hp) is $hp = h_{max} + 0.7h_{p-1} + 0.5h_{p-2} + 0.3h_{p-3}$; where $_p$ = computable water yield in the basin; h_{max} = maximum from daily yields observed after the now covered area of basin was less than 96% and the water level at the Roikovo water station was 00 cm above zero and h_{p-1}, h_{p-2} = yield for preceding 1st, 2nd and 3rd days. For forecasting the naximum level and dates of flood passage on the Seim River at L'gov the graphic relationship of H_{max} with total inflow averaged for 2 days is given by $H_{max} = f\left(\frac{q_{max} + q_{p-1}}{2}\right)$ where q_{max} = maxi- num total inflow per day, q_{p-1} = total inflow of preceding day. Tables giving the initial and com- uted data for determining magnitude and time of arrival of computed water yield in the basin, omputations for determining runoff coefficient for the period of spring flood formation, initial and omputed data for constructing final relationships for forecasting maximum spring levels on the eim River at Roikovo, and graphs relating maximum flood levels to total inflow, to computed yield nd runoff coefficient in basin, etc., are presented. *Subject Headings:* **1. Short range flood fore- asting 2. Snow melt effects 3. Seim River, U.S.S.R.**—*I.L.D.*

12L–395 551.509.329:551.311.1

Germanishvili, V. Sh., **Shuga na rekakh Kavkaza i vozomozhnosti prognoza ee poiavleniia.** Sludge on Caucasian rivers and possibilities of forecasting its appearance.] *Moscow. Tsentral'- yĭ Institut Prognozov, Trudy,* No. 58:3–36, **1957.** 9 figs., 7 tables, 16 refs. **DLC, DWB**—A omprehensive study dealing with the conditions favoring the formation of sludge and its accumu- ation in the mountain rivers of the Caucasus, and Central Asia, including the crystal forms of ludge, etc.; the distribution of the frequency of sludge occurrence in the mountain rivers includ- ng dates of beginning and disappearance of sludge number of days per month and year and related ir temperatures; the daily variation of sludge appearance; and the possible short range forecast- ng of sludge as illustrated by the examples of the Akhivian, Zelenchuk and Potzkhov Rivers. The ost widespread forms of crystals in the sludge are spherical and the accumulation of ice and ludge are observed in pools and bends. Six regions characterized by particular sludge features re described. The most favorable conditions for sludge appearance occurred during particular ariations of heat exchange when the sludge forming at night converted to solid ice, but did not elt by day. An empirical relationship for forecasting sludge appearance is developed namely:

$$(\Sigma t_a)_{min} = f(t_b)$$

nd

$$(\Sigma t_a)_{min} = f\left(\frac{\Sigma t_a}{n}\right)$$

vhen n = number of days in the given period preceding the transitions of the air temperature hrough 0°C, and Σt_a = sum of negative air temperatures. Maps showing the occurrence of sludge ncluding mean number of days in winter and number of days with sludge in winter, graphs show- ng variation, of number of days with sludge with elevation, the relationship of days with nega- ive temperature with ice appearance and the relationship of sludge appearance to air temperature nd numerical data from which the maps were constructed, frequency of sludge at various air emperatures, etc. are presented. *Subject Headings:* **1. Sludge accumulation 2. River sludge 3. Sludge forecasting 4. Caucasian rivers, U.S.S.R.**—*I.L.D.*

12L–396 551.509.329:551.579.4

Hopkins, Charles D., Jr. (*Tulsa River Forecast Center, U. S. W. B., Tulsa, Okla*), **[Discus- sion of] J. E. Nash and J. P. Farrell: A graphical solution of the flood-routing equation of linear storage-discharge relation.** *American Geophysical Union, Transactions,* 37(4):500–501, Aug. **1956.** table, 2 refs. **DWB, DLC**—In this discussion the author points out that the method leveloped by NASH and FARRELL (*see* 6.11–311, Nov. 1955, *Met. Abs.*) is applicable to river forecasting. *Subject Headings:* **1. Flash control 2. Graphical presentation 3. River fore- casting.**—*I.L.D.*

12L–397 551.509.329:551.579

Huang, Wan-Li (*Tsing Hua Univ.*), **An analysis of hydrograph of surface flow due to rainfall at a point.** *Acta Geophysica Sinica* (Peking?), 4(1):57–77, 1955. 15 figs., 9 refs., 5 eqs. In Chinese; English summary p. 76–77.—A critical review of various empirical methods of quantitative hydrological forecasting of runoff from precipitation at a point in a small basin.

R. E. Horton and E. V. Boldakov and the author's theory and methods for small basin ru analysis are discussed and compared with examples. The shortcomings of the former met are said to be overcome by the author's method. Many hydrographs are included. *Subject H ings:* **1. Rainfall-runoff relationships 2. Hydrologic forecasting 3. Point-rainfall hy graphs. I. Horton, R. E. II. Boldakov, E. V.**—*M. R.*

12L–398 551.509.329:551.579:51

Kälin, A., **Application de tests statistiques a la prévision d'apports globaux a l'aid régressions.** [Application of statistical tests to the forecasting of total runoff by means of gressions.] *International Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Tr actions*], Vol. 3, pub. **1958.** p. 50–66. 4 refs., 57 eqs. French résumé p. 50. **DWB** (M 1611g)—The estimation of the contributions from any basin through which water flows du any interval of time is important before establishing an index for the management and utiliza of such a basin. A description of the regression and correlation order of water is given result of Swiss investigation. By statistical tests it has been possible to forecast the total ru of an area. This method as used in the United States and France is described. *Subject H ings:* **1. Runoff forecasting 2. Regression equations 3. Statistical forecasting.**—*N.N.*

12L–399 551.509.329:551.579

Kalinin, G. P., **O razvitii metodiki prognozov vodnogo rezhima v rabotakh Tsen nogo instituta prognozov.** [Development of methods of forecasting the water regime in Central Forecasting Institute.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 55:3 **1957.** eq. **DLC**—A brief account is given of the development of hydrology in Russia from end of the 19th century until the end of World War II, in particular, the fundamental prob investigated, the status of hydrological forecasting, etc. The expansion and scope of hydrolo studies carried out in the Central Forecasting Institute on the formation of spring runoff, cal tion of the rate of snow, melting using the heat balance method; computation of runoff lo construction of subsidence curves; forecasting of the runoff of mountain streams, etc. W maintaining that the general field of hydrological studies in the U.S.S.R. is greater than ab the author states that the forecasting of rain, floods and also the experimental study of run less advanced than in the U. S. Also the Soviet Union is backward in the use of elect machines for forecasting floods. The possibility of using electronic computing machines t termine the parameters for numerous runoff equations, the operational work of forecastin agriculture, hydroelectric, industry, etc. are discussed. *Subject Headings:* **1. Hydrologic casting 2. Runoff research 3. U.S.S.R.**—*I.L.D.*

12L–400 551.509.329:551.579

Kalinin, G. P. and Makarova, T. T., **K metodike opredeleniia poter' talogo stoka.** [Me ology of determining snow melt runoff losses.] *Moscow. Tsentral'nyĭ Institut Prognozov, T* No. 65:3–22, **1958.** 6 figs., 9 tables, 11 refs., 10 eqs. **DLC**—An attempt to establish the area tribution of the parameters characterizing the aqueous physical properties of soil, to determi factors influencing them and to develop a method for determining the cause of adsorption of water during the snow melting period. The formula for computing mean intensity and mean tion of snow melting and moisture deficit of the soil and the equation for computing the para characterizing the maximum adsorption of melt water by the soil K_{max} is developed, n

$$K_{max} = \frac{\bar{k}}{(1 - \bar{h}_l)}$$

where h_l mean depth to which soil is frozen. The distribution of, the paran of adsorption in the European USSR is discussed with the aid of tables and maps. The distrib of the depth of the mean level of ground waters in the European USSR is outlined and its depen upon precipitation, maximum possible evaporation during complete soil saturation or durin function of the horizons of surface and ground water coefficients of filtration of the surface and water bearing layers, mean depth of erosional cuts, total extent of the erosional cuts and the a inclination of the water bearing layers are analyzed with the aid of numerical data and equa The general forecast of spring runoff, methods for accurately forecasting spring runoff and vari of water losses during snow melting are analyzed by means of relevant equations and data. *Headings:* **1. Snow melt runoff forecasting 2. Runoff calculations 3. U.S.S.R.**—*I.L.D.*

12L–401 551.509.329:5

Kalinin, G. P., **Run-off calculations and forecast according to water storage in the network and to its water inflow.** *International Association of Scientific Hydrology, To Sept. 1957,* [*Transactions*], Vol. 3, pub. **1958.** p. 78–88. 8 figs., 9 refs. (in Russian French summary p. 78. **DWB** (M(06) I611g)—The author enumerates eight important f

knowledge of which is necessary in the calculations and forecast of water storage in a river basin. Among these are the meteorological factors, such as precipitation and the topography of the area. Mathematical analysis is given for the improvement of the river run-off forecasting technique, in a river network and its inflow. *Subject Headings:* **1. River hydrology 2. Runoff forecasting.**—*Transl. of French summary (N.N.)*

12L–402 551.509.329:551.526.6

Karakash, A. I., **Metod prognoza temperatury vody v Barentsevom more.** [Method of forecasting water temperature in the Barents Sea.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 57:3–39, **1957.** 27 figs., 26 tables, 11 refs., eq. **DLC**—A method is based on an analysis of the available material on temperature, salinity, density of water current flow and ice conditions over the period of 1878–1953. There have been established a series of relationships allowing to predict with sufficient accuracy (0.3–0.5°C) the mean monthly temperature of water at different depths (25–50, 50–100, 100–200 m and at the bottom) 3 to 7 months in advance. The contents of the comprehensive study are the following: a brief account of the history of oceanographic studies in the Barents Sea, observational data and their treatment, distribution of water temperatures in the sea, fall-winter synoptic processes determining positive and negative anomalies of water temperatures and light and severe ice conditions in the subsequent summer, ice, salinity and density conditions in the Barents Sea; seasonal current flow; and the actual forecasting of water temperature by means of empirical temperatures for individual months, which are presented in tables together with confidence rating. The results of observations and computations are presented in tables and graphs. *Subject Headings:* **1. Sea temperature forecasting 2. Oceanographic data 3. Barents Sea.**—*I.L.D.*

12L–403 551.509.329:551.579.4(282.251)

Khanina, R. M., **Formirovanie polovod'ia v basseĭne verkhneĭ Obi i prognoz Novosibirskoĭ GES.** [Development of floods in the upper Ob basin and forecasting of the ten-day water influx into the Novosibirsk Hydroelectric Plant.] *Moscow. Tsentral'nyĭ Institut Prognozov Trudy,* No. 50:71–85, **1957.** 6 figs., 8 tables, 7 refs., 5 eqs. **DLC**—[A method of forecasting decadal influx of water into the Novosibirsk Hydroelectric Station reservoir for the spring flood and summer-fall low water periods. The contents of this study include a detailed analysis of the atmospheric and hydrographic conditions involved in the formation of spring floods in the Upper Ob basin and the exposition of a method for forecasting mean decadal discharge of water of the Ob River at Novosibirsk and an examination of the reliability of this method.] It was found that two waves of spring floods occur on the Ob River at Novosibirsk, the first is formed by runoff resulting from snow melt in the plains and foothills of the basin; the other by the melting of high mountain snow and ice. On the basis of computation of total influx of water into the river network, channel supplies and a coefficient characterizing the proportion of runoff of lowland rivers it is possible to forecast the mean ten-day discharge of water at Novosibirsk. In order to increase the accuracy of the ten-day forecasts it is possible to prepare supplementary forecasts of five-day water discharges. *Subject Headings:* **1. Flood forecasting 2. Spring floods 3. Snow melt 4. River discharge computations 5. Ob River, U.S.S.R.**—*I.L.D.*

12L–404 551.509.329:551.579.1:551.579.4(282.251)

†Kharshan, Sh. A., **Prognozy stoka polovod'ia gornykh rek Sibiri.** [Flood discharge forecasts for Siberian mountain rivers.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 67: 58–117, **1958.** 19 figs., 9 tables, 21 refs., 4 eqs. **DWB**—The conditions of flood formation on the rivers of the Altai-Saian-Baikal region and methods of flood runoff forecasting for the mountain rivers of Siberia. The contents comprise the following: an account of the size of the river basins; a description of the mountain ranges; the soil characteristics; the temperature, precipitation and snow cover regime; monthly river level and flow variations; the characteristics of flood formation on rivers in the mountainous regions of the Altai-Saian; formulas for computing distribution of snow supplies with height; amount of melt water formation; relationship between modular coefficients of precipitation of mountain and lowland stations; computation of precipitation runoff, etc.; method of forecasting runoff for individual flood periods—for May–June alone, and May alone; and methods of forecasting maximum flood discharges of the Enisei River at Krasnoiarsk. *Subject Headings:* **1. Flood forecasting 2. Runoff forecasting 3. River discharges 4. Siberia, Asiatic U.S.S.R.**—*I.L.D.*

12L–405 551.509.329:581.143:634.64

Kibardin, R. E., **Metodika prognoza srokov nachala tsveteniia granata.** [Method of forecasting the date of the beginning of the flowering of pomegranates.] *Meteorologiia i Gidrologiia,*

Moscow, No. 9:29–31, Sept. 1959. 2 refs. **DWB, DLC**—A quantitative index for the beginn of flowering of the pomegranate which has a rather long flowering period, from mid-May to end of July. The method involves the use of the sum of effective temperatures characterizing beginning of flowering. In the Azerbaidzhan S.S.R. where springs with unstable temperatures frequent, the first transition of mean daily air temperature through 5°C is taken as the beginn of summation. By means of correlation it was possible to establish a definite relationship betw the sum of mean daily temperature above 5°C and the duration of the period with temperatu above 5°C from the first passage through this limit to the beginning of flowering (x). The c relation coefficient is $2 = 0.71 \pm 0.04$ and the regression equation is $y = 5.1x + 645$ where $y =$ s of effective temperature for the period from the first passage through 5°C to the start of flow ing of the pomegranates. The application of this formula to forecasting in Azulaidzhas is cussed. *Subject Headings:* **1. Flowering of pomegranates forecasting 2. Azerbaidzhan S.S —*I.L.D.***

12L–406 551.509.329:551.579(4

Lambor, Julian, **Évaluation du coefficient d'écoulement pour les prévisions hydrologiqu** [Evaluation of the runoff coefficient for hydrological forecasting.] *Acta Geophysica Polon* Warsaw, 5(4):267–276, **1957.** 6 figs., 5 eqs. Polish summary, p. 276. **DWB, DLC.** Also iss in *International Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Proceedings*], Vol. 3, p **1958.** p. 18–25. 5 figs., 5 eqs. French résumé, p. 18. **DWB** (M(06)I6119).—Owing to the diffic of evaluating the runoff coefficient from precipitation and runoff data directly Polish hydrolog are engaged in evaluating water losses and thereby determining ultimately the runoff. Lo during time considered are not constant but vary from a maximum at the beginning of the rain to a gradual diminution. Among the various factors acting to reduce runoff in the first phase, retention capacity of the soil is most important. The index of moisture capacity of the soil is termined by the formula:

$$\sqrt{r} = \frac{1}{120} \sum_{i=1}^{i=15} w_e \sqrt{p_i},$$

The equation for determining losses during the first runoff phase is $A = f\left(\frac{1}{r}, p\right)$. The determ tion of losses due to factors acting during the entire rainfall duration (infiltration of water into soil and its percolation into the deeper layers); hence losses due to evapotranspiration is made by equation $B = f(p, t)$ where t is rainfall duration. The formula for computing losses of wa namely the difference between the volume of precipitation and of runoff is

$$S = \frac{a \cdot p0.3}{\sqrt{r + 0.01}} + C \cdot pr_t m$$

where P = total precipitation volume in the watershed basin, m, n = unknown exponents depen upon local conditions. The evaluation of the exponents, and the utilization of the formula and determination of the volume of the flood by $V = P - S$ so that the determination of the r coefficient $\left(a = \frac{P - S}{P}\right)$ become superfluous, are illustrated. *Subject Headings:* **1. Runoff eva tion 2. Hydrologic forecasting 3. Poland.**—*I.L.D.*

12L–407 551.509.329:551.

Lambor, Julian (*Warsaw Politechnic School*), **Prévision de la hauteur des crues.** [I casting of floods.] *Acta Geophysica Polonica, Warsaw,* 4(3):125–138, **1956.** 6 figs., 3 refs eqs. Polish summary p. 137–138. **DWB, DLC**—A new method of forecasting the affluen flood waves on a mountainous sloping terrain of from a thousand to several thousand s kilometer area. The method is based on the determination of a general coefficient of runof pending on actual conditions, and the subsequent determination with the aid of the coefficie the summary volume of the flood wave which passes through the profile. The volume of r thus determined can later be split into runoffs per seconds. *Subject Headings:* **1. Flood casting 2. Runoff.**—*A.M.P.*

12L–408 551.509.329:551.579.4(282

Larrieu, J. (*Service des Études et Recherches Hydrauliques d'Electricite de France*), **tribution a l'étude des crues.** [Contribution to the study of floods.] *Société hydrotechniq France, Mémoires & Travaux,* 2(2):160–164, **1954.** 4 figs., 2 tables, ref., eqs. **DWB,**

(Govt. Pub. R.R.)—A new method in constructing synthetic hydrographs is explained on the basis of floods experienced on the Durance River. A fundamental equation in form of a double integral, involving exponential function is proposed. *Subject Headings:* **1. Flood forecasting 2. Hydrodynamics 3. Durance River, France.**—*A.A.*

12L–409 551.509.329:551.579.4(73,510)

Liu, Hung-hsi, **The principles of flood forecasting service: Its signification and basic techniques.** *Meteorological Bulletin,* Taipei, Formosa, 4(4):10–14, Dec. **1958.** 2 figs. In Chinese; English summary, p. 10. **DWB, DLC?**—River forecasting Service was established in the U. S. in the 19th century and has been a part of the services of U. S. Weather Bureau since 1893. The modern ideas and techniques of river forecasting were contributed by Robert E. Horton, M. M. Bernald, K. Sherman, C. S. Jarvis, J. F. Miller, C. S. Bennett, G. R. Williams, R. K. Linsley, M. A. Kohler, J. L. H. Paulhus and others during the last three decades in the U. S. Now, the flood forecasting is one of the most efficient and successful services throughout the States. The author was a fellow graduate and took some courses which related to hydrometeorology at St. Louis University, St. Louis, Missouri, and then visited many hydrologic and hydraulic organs from coast to coast. This article is to try to explain what we should do and how to establish the river forecasting service in China under the following topics: 1) network of Hydrologic Stations; 2) automatic rainfall stations; 3) the technique of surface runoff forecasting; 4) the basic method of flood control; 5) evaluation of flood forecasting in the multi-purpose reservoirs and 6) outlook and suggestions. *Subject Headings:* **1. River forecasting 2. Flood forecasting 3. History of hydrology 4. United States 5. China.**—*Author's abstract.*

12L–410 551.509.329:551.509.59:551.579(472)

Makarevich, T. N., **O metodike gidrologicheskikh prognozov po territorii Severo-Zapada SSSR.** [On the methods of hydrological forecasting for the territory of the northwestern part of the U.S.S.R.] *Meteorologiia i Gidrologiia,* Moscow, No. 12:28–31, Dec. **1960. DWB, DLC**—The application in the northwest of hydrological forecasting techniques developed in other regions is complicated by the specific features of the area. Among these are the complex hydrological regime, the lake regulation, the instability of the winter regime, i.e., the interruption in the development of ice phenomena, the absence of a stable snow cover in some areas and the large volume of the precipitation runoff. In addition, the network of observations is sparse. This paper discusses these difficulties and describes the program of work currently being undertaken to combat these difficulties. Some of the problems still to be solved are listed. *Subject Headings:* **1. Hydrologic forecasting 2. Northwest U.S.S.R.**—*R.B.*

12L–411 551.509.329:551.579(282.247)

Miliukov, P. I., **O prognoze stoka r. Dnepra v zimniĭ period.** [Forecasting the winter flow of the Dnieper River.] *Moscow. Tsentral'nyĭ Institut Prognozov,* Trudy, No. 44(71):59–75, **1956.** 5 figs., 3 tables, 7 refs., 9 eqs. **DWB**—The forecasting of monthly winter runoff is similar to that of summer runoff for which the relationship $Q_p = f(W_1 q)$ has come into use (Q_p = mean discharge of water for month for which forecast is made, W = water reserve in channel network or day forecast is made, q = inflow of water into channel network). The reserves of water on the channel network are computed in most cases by means of the equation $W = f_1(Q_1) + f_2(Q_2) + \cdots + f_n(Q_n)$ where Q_1, $Q_2 \cdots Q_n$ = water discharges at the points 1, 2 . . . on the day on which reserves are counted up. The forecast of melt water runoff is based on the dependence of runoff upon the volume of water in the channel network. The winter runoff of Dnieper River is divided into two parts: (1) that arising from water arriving into the channel network before ice formation and from thawing and (2) that due to underground feeding supply and to the least extent from thawing. The volume of water in the channel network is determined from the equation $W_{total} = tQ + W_0$ where W_v = volume of water in the channel at zero discharge, t = time of flow of water in the open channel. The methods and results of calculations of water volumes in channel networks are presented. The method of forecasting runoff of the Dnieper River for Feb. and for the period from Feb. to the start of spring floods is illustrated and the possibility of forecasting runoff for Jan. is discussed. *Subject Headings:* **1. Winter runoff forecasting 2. Dnieper River, U.S.S.R.**—*I.L.D.*

12L–412 551.509.329:551.579.4

Nezhikhovskiĭ, R. A., **K voprosu o sostavlenii gidrologicheskikh prognozov dlia neiuchennym vodnym rezhimom.** [Hydrologic forecasts for rivers with artificially controlled water regimes.] *Meteorologiia i Gidrologiia,* No. 11:37–40, Nov. 1956. fig. **DWB, DLC.** Trans-

lation into English, **DWB** (626 N575hy)—The hydrologic forecasts for regulated rivers an reservoirs in the northwestern part of European U.S.S.R. issued by the Hydrometeorological Serv ice are examined. These are issued chiefly for the rivers, lakes and reservoirs of the Neva Rive The hydrography of the Neva River basin and for the regulation of the water regime of this regic is described. The forecasting of quantity of water flowing into reservoirs either on the basis o river flow or direct flow into the reservoirs are discussed. *Subject Headings:* **1. Hydrolog forecasting 2. Hydrography 3. Neva River, European U.S.S.R.**—*I.L.D.*

12L–413 551.509.329:551.57

Nezhikhovskiĭ, R. A., **K voprosu o sostavlenii gidrologicheskikh prognozov dlia neiucher nykh rek.** [The presentation of hydrologic forecasts for rivers that have not been studied] *Meteorologiia i Gidrologiia,* Leningrad, 7:39–40, July 1957. 2 figs., eqs. **DWB, DLC**—I hydrologic forecasts of rivers that have not been studied it is necessary to know what range error is permissible and what is the "natural probability" of the value that is being forecast. T secular range and natural probability depends upon the coefficient of variation (C_2), coefficient asymmetry (C_u) and number of terms in the series (N). The higher the coefficient C_2 t greater is the deviation from the mean and hence the greater the range. With an increasin number of terms in the series there appear as a rule, more and more extreme limits which exce observed values—$A_k = f(N, C_u)$. Function $A_k = f(N, C_2)$ is determined from the tables Foster-Rybkin. A graph of this function is presented. By means of this graph it is possil to determine the secular range in the absence of observations. Also a diagram for determini the natural probability is given. *Subject Headings:* **1. Hydrologic forecasting 2. Forecast aid** —*I.L.O*

12L–414 551.49:551.509.3

Parshin, V. N., **[Comment on] P. M. Mashukov: O nekotorykh oshibkakh v literatu po gidrologicheskim prognozam.** [Some errors in the literature of hydrological forecasting] *Meteorologiia,* Moscow, No. 12:44–46, Dec. 1960. 2 refs. **DWB, DLC**—Mashukov's pa (*see Akademiia Nauk Uzhekshoĭ SSR, Izvestiia, Ser. Tekhn.,* No. 3, 1960) criticises much of t literature on hydrological forecasting on the grounds that they contain too much empiricalis Some particular criticisms of Mashukov are answered here. *Subject Heading:* **1. Hydrolog forecasting.**—*R.B.*

12L–415 551.509.329:551.579.4(47

Popkov, A. A., **Leningradskie navodneniia i ikh predskazanie.** [Leningrad floods and th forecasting.] *Meteorologiia i Gidrologiia,* Leningrad, No. 7:33–35, July 1959. 3 figs. **DW DLC**—Two cyclones cases moving from the north through Scandinavia and from the south end of Sweden as studied. In connection with these cyclones water in the Gulf of Finland a estuary of the Neva River rose with speed affected by the velocities of movements of the cyclo and the atmospheric front. The rate of rising water was computed with an empirical form based on the analysis of previous observations of atmospheric pressure, differences between t selected points, barometric tendency on the top and bottom of the waves, velocities of cycl and atmospheric front and the wave velocity. *Subject Headings:* **1. Flood forecasting 2. Len grad, U.S.S.R.**—*N.P.S.*

12L–416 551.509.329:551.

Popov, I. V., **La recherche des changements des bords de retenues et leur prévisi** [Investigation of changes in the banks of reservoirs and their forecasting.] *International sociation of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], Vol. 3, pub. **1958.** p. 3 346. 8 refs. **DWB** (M(06) 1611g)—Changes in the banks of many reservoirs have b investigated both in Europe and in Asian U.S.S.R. An outline of the basic areas of research these regions is given. This is followed by a discussion of the hydrological data obtained for forecasting of such changes. *Subject Headings:* **1. Hydrologic forecasting. 2. Reservoir ba 3. Europe 4. Asian U.S.S.R.**—*N.N.*

12L–417 551.509.329:551.579(

Rakhmanov, V. H., **Razvitie gidrologicheskikh prognozov za 40 let.** [Forty years of velopment of hydrologic forecasts.] *Meteorologiia i Gidrologiia,* Leningrad, No. 11:51–59, N **1957. DWB, DLC**—Forecasts of maximum level of river flood stages on the basis of t winter precipitation and deviation of air temperature from the normal during the same per The development of methods of ice forecasts were carried out in the 1920's and in 1930's a spe hydrological forecast section was established in the Central Weather Institute and various hy

meteorological institutes were established in the individual republics. During this period extensive research was carried out on forecasting river ice regime, on the dependence of freezing and thawing of rivers upon atmospheric processes etc. After the Second World War, methods were developed for forecasting runoff in plains and mountain regions, especially the use of the water balance. The problem of evaporation measurement, the analysis of snow survey data to determine snow accumulation, the characteristics of runoff in areas which have a homogeneous physical geography, the accumulation of water reserves in river systems, etc. were investigated in relation to hydrological forecasting. At the present time considerable attention is being devoted to studies on the effect of human activity upon the hydrological regime of rivers. Also, methods for both short range and long range forecasts of ice formation on rivers are being developed. Finally, the publication and information work of the hydrological forecast section of the Central institute of forecasting is described. The names of the various investigators and their individual contributions are listed. *Subject Headings:* **1. Hydrologic forecasting 2. History of hydrologic forecasting 3. River ice forecasting 4. U.S.S.R.**—*I.L.D.*

12L–418 551.509.329:551.579:551.482.2

Sapozhnikov, V. I., **O prognoze vodnogo rezhima na zaregulirovannykh uchastkakh rek.** [Forecasting the water regime of regulated river sections.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 75:47–60, **1958.** 11 refs., 13 eqs. **DWB, DLC**—The author gives a few practical recommendations and develops methods of short range water regime forecasting of regulated river sections. In view of the fact that the river sections below the water reservoir and hydroelectric station can be with or without tributaries, the author develops methods of forecasting for both these cases. *Subject Headings:* **1. Water regime forecasting 2. River regime forecasting.**—*A.M.P.*

12L–419 551.509.329:551:579.2(494)

Schweizer, W. (*Birmensdorf-Zurich*), **Comment prévoir le débit estival d'un cours d'eau alpin?** [How can the summer runoff of an Alpine water stream be forecast?] *Revue de Géographie Alpine,* Grenoble, 46(1):181–191, **1958.** 5 figs., 5 refs. **DWB**—Examples from the Maggin, Rhone and Rhine basins in Switzerland are given to show the accuracy with which winter snow reserves in the high mountains can be used to predict summer runoff. The method (used on the west coast of the USA) of correlation by means of regression curves, seems to work fairly well in Switzerland where most of the water supply comes from snow. Errors are due to temp. and precip. since last data used and to unrepresentativeness of the few snow gages. *Subject Headings:* **1. Water supply forecasts 2. Hydrologic forecasting 3. Rhone Basin, Switzerland.**—*M.R.*

12L–420 551.509.329:551.579.4

†Subbotin, A. I., **K vorprosu o dolgosrochnom prognoze raskhodov i urovneĭ vody v rekakh v period letneĭ mezheni.** [Long range forecasting of river discharge and level during summer low water.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 50:137–168, **1957.** 11 figs., tables, 33 refs. **DLC**—A method is presented for long range forecasting of that portion of the summer runoff of rivers which is determined by the influx of underground water in the basin, the resources of which may be known at the beginning of the low-water period. On the basis of the initial discharge of water into the river during the low-water period and the supply of underground water in the basins, it is possible to predict the total runoff during the summer period (minus the runoff of rain floods); it is also possible to predict the curve of fall of discharge during this period. The author examines the proportion of underground runoff in the monthly runoff of rivers with and without consideration of underground feeding, the effect of the regime of variation of underground feeding, the effect of the regime of variation of underground waters and river waters, the influence of hydrogeological factors, the equations expressing the rate of exhaustion of underground waters, the instability of the river channels during the low-water period and the consequent unreliability of measurements of water level is illustrated by conditions on the Don, Dnieper and Volga basins, instability of the earth's surface and its relationship to the intensity of erosion and level depth of river channels, etc. Long range forecast of volume and distribution of summer runoff in regions with large summer rainfall is impossible without long range weather forecasts. Without a reliable long range weather forecast only that part of the summer runoff resulting from accumulated water in the basin at the moment of forecast can be predicted. By taking as an index the water supply in the basin and the minimum discharge of water in a river at the start of the low-water period and by separating the underground component of runoff on the basis of minimum monthly discharge, it is possible to forecast the total low water runoff of a river determined by given water storage. In regions

of insufficient moisture, where summer floods are infrequent, the total runoff volume can b predicted. *Subject Headings:* **1. Long range runoff forecasting 2. Runoff forecasting**—*I.L.D.*

12L–421 551.509.329:551.542:551.43(235.2

*†Tu, Hsing-Yüan, **Prostranstvennaia zadacha chislennogo prognoza baricheskogo polia uchetom vliianiia vysokogornykh plato.** [Dimensional problem of forecasting the pressur field, taking into account the influence of high-mountain plateaus.] *Leningrad. Glavnaia Geo fizicheskaia Observatoriia, Trudy,* No. 99:93–104, **1959.** 10 tables, 24 refs., 13 eqs. Russia summary p. 103. **DWB**—A study aiming at the development of new formulas allowing for bot the general mountain lift and more specifically the earth-surface boundary conditions. Hig mountain plateau irregularities are determined by a two-way approach. First, the plateau is con sidered to be flat i.e., assuming that its height is the same everywhere and then the lower boundar condition is taken into account. The problem is solved by the semi-straight method. The fore casting is made by the graphoanalytical method at two levels (850 mb and 500 mb). Formula are derived and solved in conformity with geographical conditions of Tibet and the Mongolia Plateau. *Subject Headings:* **1. Pressure field forecasting 2. Topographic influences Tibet 4. Mongolian Plateau, Mongolia.**—*A.M.P.*

12L–422 551.509.329:551.511:551.558

Tkachenko, A. V., **O moshchnosti konvektsii i ee ispol'zovanii pri lokal'nykh pro nozakh.** [The "energy of convection" and its use of local forecasting.] *Leningrad. Glavna Geofizicheskaia Observatoriia, Trudy,* No. 69:36–40, **1957.** 4 refs., 10 eqs. **DLC**—The metho of "energy of convection," which is generally used in forecasting convection, is discussed in con parison with the method of "energy of instability." Convection power corresponds to the wo of all air masses participating in convectional movements and the "energy of convection" is relat only to one unit of mass. The integral equation is developed for changing kinetic energy in t convectional movement in unit of time, with consideration of the roughness coefficient of t ground surface and the turbulence factor, affecting the intensity of convection. The method "energy of convection" can be used for forecasting the intensity of convection, based on t aerological observations of temperature and wind characteristics. Processes of determination the convection energy and intensity of convection are described in detail and with referen to specific recordings of the meteorological data and preparation of the synoptic maps. *Subj Headings:* **1. Convection forecasting 2. Local forecasts.**—*N.P.S.*

12L–423 551.509.329:551.5

*Turketti, Z. L., **O prognoze polei davleniia na 2–3 sutok.** [Forecasting pressure fie 2–3 days in advance.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy,* 73:57–72, **1958.** figs., 6 tables, 11 refs. **DWB**—A discussion of adoption of the forecasting of the baric fields dynamic and synoptic meteorology in different countries. Various methods of preparation forecasting charts are briefly analyzed in view of a proposed method of outlining forecasting the pressure fields with consecutive computation of the thermo-baric field (AT_{500} and OT50 1000) and also near the ground pressure field by empirical methods. The graphic method described also with consideration of advective and dynamic factors, affecting the pressure chan on the ground surface. Factual material and synoptic statistical relations are analyzed for eval tion of velocity and direction of movements of isallohypse sources and changes in their intens Special attention with chart illustration, is given to the frequency in velocities of the isallohy movements and their dependence of direction and velocity of wind gradients. The order of co putation of the pressure field is briefly described with assumption of baric field forecast on ground surface as the difference of the pressure of field (AT_{500}) and thermic field (OT500/10 at the beginning of the first day; then, at second and third day. The detailed technique of computation is described in another paper by the same author. (*See* 12L–424, *Met. Abs.*) *Su ject Headings:* **1. Pressure field forecasting 2. Local forecasts.**—*N.P.S.*

12L–424 551.509.329:551.

§Turketti, Z. L. and Iakusheva, O. M., **Postroenie prognosticheskikh polei davleniia na sutok.** [Construction of prognostic pressure fields 2–3 days in advance.] *Moscow. Tsentral Institut Prognozov, Trudy,* 73:73–93, **1958.** 9 figs., 3 tables, ref. **DWB**—For theoretical siderations on forecasting of pressure field (*See* 12L–423, *Met. Abs.*). The technique of c putation is described in detail in this article with 15 charts on the thermobaric fields and press field near the ground forecasted every 24 hrs for 2–3 days in advance. This pressure fiel forecast in connection with the thermobaric field of the lower half of the troposphere. The la is computed with transfer of corresponding values of the isallohypse and geopotential RT500/1 along deformed streams AT_{500} at a given time. In this manner the pressure field near the gro

is obtained as the difference between computed forecast field AT_{500} and RT500/1000. An empirical method used for this transfer is described in detail and charts are included. *Subject Headings:* **1. Pressure field forecasting 2. Forecasting methods 3. Pressure field calculations.**—*N.P.S.*

12L–425 551.509.329:551.576.1:629.135.2(2)

U. S. Air Weather Service, **Weather forecasting of aircraft condensation trials.** Its *AWS Manual* 105-100, March 11, **1960.** 21 p. 5 figs., 5 refs. Supersedes *AWS Manual* 105-100, Rev. Aug. **1956.** (*See* 9.5–17, May 1954, *Met. Abs.*) **DWB** (M(055) U58am)—A method is given to forecast jet and propeller aircraft condensation trails. Definitions and a set of graphs and tables with the procedure for their use are also given. In case of their attack contrails can become of vital importance and the parameters on which the formation of the contrail depend are pressure, temperature, relative humidity and ratio of water vapor to heat. In a figure, the minimum relative humidity is shown which gives rise to jet exhaust trail formation. An extensive evaluation of contrail formation graphs show 87% accuracy. Best results are obtained by assuming relative humidity near 40%. *Subject Headings:* **1. Condensation trails 2. Control formation 3. Air weather service manuals.**—*A.H.K.*

12L–426 551.509.329:551.579.4

Vazhnov, A. N., **Prognoz stoka polovod'ia gornykh rek na osnove territorial'no obschikh zavisimostei.** [Forecasting spring flood runoff of mountain rivers on the basis of relationships common over a territory.] *Meteorologiia i Gidrologiia,* Leningrad, No. 5:20–25, **1958.** 4 figs., 4 refs., 2 eqs. **DWB, DLC**—The author presents a method or territorial forecasting of spring flood runoff on the basis of general areal relationships for eastern Transcaucasia. The relationship between mean long period values of flood runoff and winter and spring precipitation, between melt water runoff and winter precipitation, and between rain runoff and fluid precipitation for Eastern Transcaucasia are discussed with the aid of relevant curves. The relation between melt water and runoff and snow reserves for the Aragvi River basin shows that the losses of melt water in individual years increase as snow reserves increase but this increase is rather slow. The effects of fall precipitation upon flood runoff are slight. Accordingly $\frac{y_s}{\bar{y}_s} = f\left(\frac{x_s}{\bar{x}_s}\right)$, namely: the ratio of meltwater runoff of a given year to its normal is a function only of the ratio of snow reserves to their normal. This relation is expressed for eastern Caucasia by the formula

$$\frac{y_s}{\bar{y}_s} = 1.5\frac{x_s}{\bar{x}_s} - 0.5 \qquad \text{or} \qquad y_s = 1.5\bar{y}_s\frac{x_s}{\bar{x}_s} - 0.5$$

where y_s = expected magnitude of melt water runoff, $\bar{y}_s$ = its normal, x_s = snow reserves in a given year, and $\bar{x}_s$ = their normal. This equation holds for values of $x_s/\bar{x}_s$ from 0.4 to 1.6 and may be used to calculate the melt water runoff during the flood period for a given year. In order to calculate runoff from precipitation during the same flood period, it is assumed that the runoff coefficient is constant from year to year and for different catchment basins this coefficient increases with increasing snow reserves as shown by a graph. The third term—constant underground water inflow is obtained from the minimum prespring discharge of water of a given year which is constant during the spring flood. The results of actual and computed runoff for seven rivers, covering a total period of 124 years, show a close correspondence. Also a method of forecasting for any river in the absence of hydrologic observations is outlined. *Subject Headings:* **1. Runoff forecasting 2. Snow melt runoff 3. Spring floods 4. Hydrologic forecasting 5. Eastern Transcaucasia.**—*I.L.D.*

12L–427 551.579.1(522.5):551.509.329

Yamaga, N., **A study on the flood forecasting over the River Shirakawa in Kumamoto Prefecture, Pt. 2.** *Journal of Meteorological Research,* Tokyo, 11(2):135–138, Feb. **1959.** 5 figs., 2 tables, 3 refs. In Japanese. **DWB**—This paper presents a study of the relation between the distribution of rainfall in the upper basin of the Shirakawa River, the water range of Ozeki bridge and the precipitation around the Asosan Mts. from April 1956 to July 1957. Detailed data are given, both in figures and tables: the maximum rainfall and water range in three hours during one precipitation period, the relation between accumulated rainfall and the lower basin of Ozeki in an hour precipitation period, the relation between maximum appearance within three hours of precipitation, and maximum water range at Ozeki and maximum rainfall continued for three hours in the Asosan Mts. The cause of rainfall was related to cyclone and front line activity. *Subject Headings:* **1. Flood forecasting 2. Water supply from precipitation 3. Shirakawa River, Kumamoto, Japan.**—*K. C.*

12L–428 551.509.329:551.579.4(282.247.4

Zmieva, E. S., **Prognozy vysokikh dozhdevykh pavodkov na r. Volge v stvore Uglichskoi GE** [Forecasting high rainfall floods in the Volga River at the Uglich Hydroelectric Plant.] *Moscow Tsentral'nyĭ Institut Prognozov, Trudy*, No. 50:122–136, **1957.** 4 figs., 9 tables, 5 refs. **DLC**—Th method of short term forecasts of rain floods involves the forecasting of total rainfall runoff an maximum discharge of flood water. The former was determined by the procedure devised by G. F KALININ (*Moscow. Tsentral'nyĭ Inst. Prog., Trudy*, **1952**). The forecast of the latter is determine by two components, one of which is dependent upon the discharge of water present in the river ne work at the time of the forecast is made (W), and the other depends upon the supplementary influ of water into the river network as a result of precipitation during the period preceding the foreca (q_x), i.e. $y = f(W,q_x)$. The water supply (W) in the channel network was determined by $W = \sum_1^n \bar{Q}_i$ ($\bar{Q}_i$ = mean discharge in the section, τ_i = time of travel in the section). The computation of t influx of water into the river network was accomplished by the following formulas: for the Vol basin to Staritsa; $q_{Star} = Q_{Star} + \frac{\Delta W_B}{\Delta t}$ and for the catchment area of the Volga from Staritsa Uglich $= q_{Star-Ugl} = Q_{Ugl} - Q_{Star} + \frac{\Delta W_H}{\Delta t}$. Computed volume of water in the river basin of t Upper Volga, precipitation, total runoff and influx during individual rain floods at the Volga ne Staritsa, precipitation and total influx in the Volga for Staritsa-Uglich, precipitation, total run and influx for individual floods on the Volga at Uglich, and maximum discharges of summer-f floods, influx and water supplies in the river system of the Volga basin up to Uglich and grap showing the dependence of the runoff coefficient of precipitation minus evaporation and upon t factor expressing seasonal variation of rainfall, and presence or absence of floods, etc. are presente The influx of water into the river system of the Volga begins two days after rainfall and termina two days after the end of the rains. The corresponding rain flood in the Uglich collection po frequently begins 3–4 days after the start of the rain period and ends 8–10 days later. *Subj Headings:* **1. Flood forecasting 2. Runoff 3. River discharges 4. Volga River, U.S.S.R.**—*I.L.*

12L–429 551.509.329:551.57

*Zmieva, E. S., **O predvychislenii raskhodov vody na spade polovodiia v usloviiakh znachitel'no pritoka talykh i dozhdevykh vod.** [Forecasting water discharge during flood recession under con tions of considerable melt- and rain-water supply.] *Moscow. Tsentral'nyĭ Institut Prognoz Trudy*, No. 65:71–83, **1958.** 3 figs., 3 tables, 7 refs., 11 eqs. **DLC**—The water discharge of riv during the recession of high water can be computed for conditions of considerable inflow of melt a rain water by using the equations of depletion in the form $Q_t = Q_0 e^{-\beta t^n}$ or $Q_t = Q_0 \frac{1}{(1+\alpha t)^2}$ (Q_t = charge of water on any day of recession; Q_0 = initial discharge on maximum high water; n = po close to unity; β and α = coefficients of depletion of rate of recession; t = days from start of re sion); but the coefficients of depletion depend upon the volume of water in the basin which cons of water supply in the river network, remains of snow supply on the date when the recession beg the amount of precipitation during the period of recession and the coefficients of runoff of this p cipitation, i.e., on the inflow of rain water into the river network during the period of high wa recession and also upon the maximum time of flow to the river system. In order to use the ab equations it is necessary to compute the mean coefficient of recession rate for each year individu by means of $\beta_{mean} = f_1\left(\frac{W}{\bar{W}}\right)$ $\alpha_{mean} = \varphi_1\left(\frac{W}{\bar{W}}\right)$ and for basins where the snow remains are sma are entirely lacking at the time of recession, and

$$\beta_{mean} = f\left(\frac{W+\eta^s}{\overline{W+\eta^s}}, qx\right), \quad \alpha_{mean} = \varphi\left(\frac{W+\eta^s}{\overline{W+\eta^s}}, qx\right)$$

for the basin of the Viatka River (W = volume of water in the river network on date of maxim s = snow supplies remaining on date of maximum area; η = coefficient of runoff of melt w $\frac{W+\eta^s}{\overline{W+\eta^s}}$ = coefficient of water volume drop expressed as a ratio of computed ($\overline{W+\eta^s}$) to that tained from $Q_{max} = f(W+\eta^s)$ and qx = inflow from rainfall during period of recession). determination of the initial characteristic for forecasting the coefficient of recession rate is discu with the aid of numerical examples. *Subject Headings:* **1. Water discharge forecasting 2. R hydrology.**—*I.L.D.*

FORECASTS FOR LONG PERIODS—WEEK, MONTH, SEASON
(551.509.33)

Extended Forecasts

See also: **Extended range forecasting** (Lee), 12L–133; **Seven day forecasting,** 12L–160; **Dynamical predictions for Arctic** (Reed), 12L–205; **Qualitative rules in long range weather forecasting** (Pokrovskaia), 12L–223; **Long range weather forecasting** (Rao), 12L–224; **Pressure and temperature fields** (Lecce), 12L–237; **Mean 7 day 500 mb chart** (Zverev), 12L–256; **Forecasting of heavy rain** (Imada), 12L–263; **Monthly weather forecasts** (Tsepkanova, Khesina), 12L–284; **Long range weather forecasting** (Bagrov), 12L–507; **Macrocirculation method** (Baĭdal), 12L–508; **Forecasting seasonal characteristics of circulation** (Vitel's), 12L–522.

12L–430 551.509.33:061.1(439.1)

Aujeszky, László, **Középtartamú prognózisok a magyar meteorológiai szolgálatban.** [Extended weather forecasting in the Hungarian Meteorological Service.] *Időjárás,* Budapest, 64 (3):182–184, May/June **1960. DLC**—The extended weather forecasting for 2–3 days started July 15, 1945 at the Hungarian Meteorological Service, and was restricted to temperature or to rain only in special cases. The omission of extended forecasting on Sundays and holidays is due to the absence of professional personnel on such days. Exceptional weather conditions such as those of late-spring frosts made it necessary to make extended forecasts up to 1954 Extended forecasts are issued as part of the noon report and are communicated by radio at 2 p.m., remaining unchanged for the 3 p.m. and evening report. *Subject Headings:* **1. Extended weather forecasting 2. Hungary.**—*O.T.*

12L–431 551.509.33:551.579(02)

§†Drogaĭtsev, D. A., **Dolgosrochnye gidrometeorologicheskie prognozy na osnove ucheta kolebaniĭ temperatury.** [Long range hydrometeorological forecasts taking into account temperature fluctuations.] Leningrad, Gidrometeoizdat, **1959.** 91 p. 24 figs., 16 tables, 31 refs. **DLC** (QC995.D75)—A number of synoptic and statistical techniques are used in this monographic pamphlet to serve as a guide to long range forecasting of precipitation in the first half of the growing season in the Ukraine, for Western Siberia and Kazakhstan, forecasting annual river runoff and precipitation in Bulgaria, Hungary and Czechoslovakia, etc. Spring floods, water temperature in the Barents Sea based on data obtained early in January, long period fluctuations of temperature of the atmosphere, interdependence of ocean and atmosphere, and correlations of other kinds are used in this approach and are discussed in separate chapters with illustrative data and charts. *Subject Headings:* **1. Long range forecasting textbooks 2. Seasonal forecasts 3. Long range precipitation forecasts 4. River forecasts 5. U.S.S.R.**—*M.R.*

12L–432 551.509.33:551.515.73:551.515.8(584)

§*Avanesova, A. G.; Kask, L. I. and Iausheva, G. Sh., **Issledovanïe repernykh ul'trapoliarnykh protsessov dlia Srednei Azii i Kazakhstana.** [Investigation of reperic ultrapolar processes for Central Asia and Kazakhstan.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 51:83–117, **1957.** 11 figs., numerous tables, 7 refs. **DLC**—Repetition of the "reperic" ultrapolar processes is accepted for the basic conditions for long range weather forecasting method. (The "reper" process is considered as a movement of the anticyclone core and cold air masses from north or northeast). Six previous investigations are reviewed with eleven combined kinematic maps of "reperic" ultra-polar processes from 1948 to 1953 and maps with 500 mb isohypses. The repetitions of the "reperic" synoptic processes are discussed in the text and data are included. Moreover the data on the "reperic" ultra-polar processes and also on synoptic processes analogous and different than them for the period 1948–1953 are assembled in the 16 page table including data on many localities throughout the U.S.S.R. *Subject Headings:* **1. Reperic processes 2. Kazakh S.S.R. 3. Asiatic U.S.S.R.**—*N.P.S.*

12L–433 519.28:551.509.33:551.515.13:551.515.73

Belinskiĭ, N. A. and Glagoleva, M. G., **Issledovanie vozmozhnosti ekstrapoliatsii poleĭ anomalii tsiklo- i antitsiklonicheskoĭ deiatel'nosti.** [Study of the possibility of extropolating the anomaly fields of cyclonic and anticyclonic activity.] *Meteorologiia i Gidrologiia,* Leningrad, No. 1:13–20, Jan. **1959.** 3 tables, 8 refs. **DWB, DLC**—The possibility of extrapolating anomaly fields of cyclonic and anticyclonic activity in order to forecast atmospheric elements and hydrological regimes was examined by investigating the cyclic nature of these anomalies. The anomaly fields, obtained from surface synoptic maps were averaged over an area between 40°W long. and 70°E long., and 35–80°N lat; and analyzed in series by means of Chebyshev polynomials. Sixteen analytical coefficients were

computed and 10, 6, 4 and 2-year waves were established. The phases and amplitudes for each of t waves in all the coefficients. Anomaly maps of cyclo- and anticyclogenesis were constructed a compared with the actual anomalies. The coefficients of correlation for each year of the inter 1928–1956 for Jan. are presented; the mean was 0.68 for the western half and 0.52 for the eastern ha The possible regular variations of phases (ϕ) and amplitudes from year to year according to slidi discrete series of Chebyshev polynomials were revealed by determining coefficients of cosines (a) a sines (b) in:

$$A \sin\left(\frac{2\pi}{T} t + \varphi\right) = a \cos\frac{2\pi}{T} t + b \sin\frac{2\pi}{T} t.$$

The mean square deviation of the actual and computed values of a and the coefficients of correlat were computed and it is shown that waves can be extrapolated a year in advance but the correlat coefficients are not large enough to forecast accurately cyclo- and anticyclogenesis. The use of 5-d mean intervals to obtain more accurate extrapolations is discussed. *Subject Headings:* **1. Ext polation of cyclonic activity anomalies 2. Extrapolation of anticyclonic activity anomalies Long range forecasting.**—*I.L.D.*

12L–434 551.509

Bliumina, L. I., **Weather forecast for seas for April 1958.** Transl. from original Russ issued as *U. S. Joint Publications Research Service, Translation* L-656N, (1958?). 4 p. ph stat of typescript. Also: **General characteristics of expected weather in the European te tory of the USSR and in Western Siberia in April 1958.** *JPRS, Transl.* L-564N, Dec 1958. 2 p. Khazova, O. N., **Forecast of general weather characteristics for the Asiatic Te tory of the USSR for April 1958.** *JPRS, Transl.* L-566N, (1958?). 4 p. Also: Bliumina, L and Khazova, O. N., **Weather forecast for the European Territory of the USSR and West Siberia for April 1958.** *JPRS Transl.* L-567N, (1958?). 12 p. All four articles are tra from the original Russian in *Dolgosrochnyĭ Prognoz Pogody,* (Leningrad?), No. 4, 1958. photostats of typescript. **DWB** (M09 L856Lo)—Each forecast contains expected wind spe temperatures, cloudiness, and other weather conditions for April 1958 (divided into several re periods in some cases) for individual regions of the U.S.S.R. and seas around it. *Subject H ing:* **1. Long range forecasting**—*G.T.*

12L–435 551.50

Calzada Benza, José, **Pronosticos del clima del invierno (1959).** [Weather forecasts the 1959 winter.] *Revista Meteorológica del Peru,* Lima, 4(7):16, June 1959. 3 refs. D (M(05)R45pe)—Using temperature and humidity studies covering 28 years, and the fact the climate influences wheat and potato crop yield, the author reaches the following conclusi 1. Two periods during the year (Feb.–April and May–Nov.) have high correlations which pe more accurate long range forecasting. 2. The yield and any attacks by diseases and pests de largely on the preceding winter. The author concludes with his prediction of winter temperat and humidity according to May readings. *Subject Headings:* **1. Winter temperature forec 2. Humidity forecasts 3. Wheat yield 4. Potato yield.**—*A.L.M.*

12L–436 551.509.33:551.5

Dobryshman, E. M., **K voprosu o dolgosrochnom prognoze polia vlazhnosti v troposfere.** [I range forecasting of moisture fields in the troposphere.] *Moscow. Tsentral'nyĭ Institut Progn Trudy,* 78:64–72, **1958.** 7 refs., 20 eqs. **DWB**—A rather complete solution of the equation fo variation of moisture (dew point) applicable to long range forecasting is presented. The equa for variation of the dew point linearized relative to the zonal state is written

$$\frac{\partial \tau}{\partial t} + \alpha(z) \frac{\partial t}{\partial x} + \omega(z,\vartheta,\lambda,t) \frac{\partial \bar{\tau}}{\partial z} + \frac{v\vartheta(z,\vartheta,\lambda,t)}{r_0} \frac{\partial \bar{\tau}}{\partial \vartheta} = \frac{k'}{r_0^2} \Delta\tau + \frac{\partial \tau}{\partial z} k(z) \frac{\partial \tau}{\partial z} - b^2 t$$

where $\bar{\tau} = \tau(\vartheta,z)$ = zonal value of dew point, $\tau = \tau(\vartheta,\lambda,z,t)$ = deviation from zonal values, = meridional vertical components of the velocity of motion; $\alpha(z)$ = index of circulation, k' $k(z)$ = coefficient of horizontal and vertical displacement, respectively

$$\Delta = \frac{1}{\sin\vartheta} \frac{\partial}{\partial\vartheta} \sin\vartheta \frac{\partial}{\partial\vartheta} + \frac{1}{\sin^2\vartheta} \frac{\partial^2}{\partial\lambda^2}$$

the double Laplacian operator in spherical coordinates, $r_0 = 6.37 \times 10^6$ m mean radius of the e t = time, $\lambda, \vartheta, z = r - r_0$ = spherical coordinates. The equation for τ is derived and its solutio particular initial and limiting conditions is presented. *Subject Headings:* **1. Long range foreca 2. Dew point variations.**—*I.L.D.*

12L–437 551.509.33:551.579(282.247)

Dogadaeva, L. P., **Prognoz ob"ema stoka i naivysshikh urovneĭ vesennogo polovod'ia bol' hoi zablagovremennost'iu.** [Long range forecasting of the amount of runoff and the highest levels of spring flooding.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:42–43, Feb. 1959. 2 figs. **DWB, DLC**—The forecasting of amount of runoff and maximum levels of spring floods 5–6 months in advance on the basis of weather factors of preceding spring floods is illustrated for the Don River and its tributaries. An empirical coefficient of the soil moisture in the basin is determined from the ratio of monthly precipitation (Σx) to monthly mean air temperature (T), i.e., $k = \Sigma x/t$. In forecasting, relationships are taken as the mean for the computation period. Neglecting fluctuations of snow accumulation the author establishes the forecast dependence of maximum levels and amount of spring runoff upon k, namely $H_{max} = f(k)$ and $y = f(k)$. These relationships are shown by means of graphs. The accuracy of this method and its operational use are discussed. *Subject Headings:* **1. Long range runoff forecasting 2. Spring floods 3. Don River, European U.S.S.R.**—*I.L.D.*

12L–438 551.509.33

Fuse, T., **On the 5-day forecasting by isopleth diagram of dew point temperature.** *Journal of Meteorological Research*, Tokyo, 9(4):287–288, June 1957. fig. In Japanese. **DWB, DLC**—Distribution of dew point is shown along 60°E and 140°E with the use of 700 mb Northern Hemisphere weather map. The method is shown in a figure, "Isopleth of dew point at 60°E meridian during April 23–May 5 in 1956" and "that at 140°E during May 1–13 of 1956," both include a pattern of dew point distribution, exactness of isolines, and correlation of high and low temperature regions. Observed values were compared with theoretical values. For forecasting purposes this may help to a certain extent, but cannot be entirely dependable. *Subject Headings:* **1. 5-day forecasting 2. Isopleth diagrams 3. Dew point temperatures.**—*K.C.*

12L–439 551.509.335:551.509.33

Gōda, I. and Shiota, T., **Analogue methods for long-period forecast.** *Journal of Meteorological Research*, Tokyo, 9(4):272–276, June 1957. 3 figs. In Japanese. **DWB, DLC**—Analogue methods are discussed in this paper in order to set up a systematic method for forecasting for five days to a month by means of the calculations and observations of the transition tendency of Grosswetter and by including the pressure curve in each area. The variations in the synoptic pattern in the past and the singularity are discussed. A method is given for analogy for the period of 1911–1954, at Tadotsuru. When applied in the Far Eastern area as a whole, this method was not much different from the actual conditions observed. *Subject Headings:* **1. Analog methods 2. Long range forecasting.**—*K.C.*

12L–440 551.509.33:551.553.2

§Hoshino, T., **On the 10-day weather forecasting by westerlies.** *Journal of Meteorological Research*, Tokyo, 9(4):263–268, June 1957. 14 figs., 2 refs. In Japanese. **DWB, DLC**—This paper is a study of the westerly wind profile and of its relative maximum track within the Northern Hemisphere. A detailed account is given on the possibility of maximum track in Bai-u season and in autumn, at shifting time from northward to southward, and in middle latitude at which the maximum is passed. Daily variation of phenomenon is indicated with the use of following: charts of variation of westerly wind (Jan.–Feb. of 1956, Sept.–Oct. of 1955, and April–May of 1956) and a number of surface weather charts for different periods. The purpose was to draw a five-day mean chart from which a height deviation could be calculated at each 5° of latitude and longitude between 20°–60°N and 125°–150°E and to measure the variation of geostrophic wind to determine movement of the maximum track. *Subject Headings:* **1. Long range forecasting 2. Annual surface wind variations.**—*K.C.*

12L–441 551.509.336:551.513.1:523.746

Kálmán, Eva (Cseh), **Az általános légkörzés távprognosztikai vonatkozásai.** [The general circulation from point of view of long range forecasting.] *Időjárás*, Budapest, 63(2):116–18, March/April 1959. **DCL**—An evaluation of N. A. Belinskiĭ's 1957 work (*see* 9.10:116–959, *Met. Abs.*) is presented. Belinskiĭ's two methods for numerical characterization of baric planes are described. His analysis of yearly variations of intensity of cyclone and anticyclone activity is presented. Some of the main results of his investigations include the following: 1) cyclone activity, mainly at lower altitudes, corresponds to the increase of sunspots; 2) increase of solar activity leads to a decrease of the interlatitudinal pressure-gradient; 3) many indications refer to the presence of 5 and 2 year periods in atmospheric processes. These results made it possible to indicate some correlations with some basic elements of the general circulation; to explain the cause of periods with abundant and little precipitation; the cause of rising water and air temperatures in high latitudes and, finally, the decrease of icing in the Northern Hemi-

sphere and in the Soviet Arctic Region. Belinskiĭ's work culminates with the statement th circulation is closely connected to solar activity. Belinskiĭ's findings are corroborated by son results of related Hungarian investigations. *Subject Headings:* **1. Long range forecasting Solar relationships.**—*O.T.*

12L–442 551.509.33:551.513:551.524.35(4

*§†Kats, A. L.; Morskĭ, G. I. and Semenov, V. G., **Formirovanie krupnykh anomaliĭ tem peratury vozdukha na territoriĭ SSSR v zimnie mesiatsy.** [Formation of major air temper ture anomalies in the U.S.S.R. during winter months.] *Moscow. Tsentral'nyĭ Institut Pro nozov, Trudy,* No. 49:3–180, **1957.** 56 figs., 52 tables, 30 refs., 70 eqs. **DLC**—In this co prehensive study of the mean monthly atmospheric temperature anomalies and the possibility forecasting them, the authors investigate the atmospheric circulation and the temperature cha acteristics of the underlying surface and temperature anomalies in their mutual interaction. T contents of this study comprise the following: the relationship between the index of zonal c culation and the general characteristics of the temperature field; a method for forecasting t absolute topography of the 500 mb surface; the relationship between the thermal regime of t underlying surface and mean monthly temperature anomalies of the European U.S.S.R. a Western Siberia including the selection of the region of greatest action of the underlying surf on atmospheric processes of European U.S.S.R.; water temperature in the northeastern Atlan Ocean and atmospheric temperature anomalies over European U.S.S.R. horizontal transport the atmosphere; mass balance and air temperature anomaly over European U.S.S.R.; and circu tion characteristics in the formation of large temperature anomalies in the U.S.S.R. during win The latter includes an examination of the zonal and meridional indices for evaluating the state the circulation, the construction and analyses of mean AT_{500} and RT500/1000 maps for the Nor ern Hemisphere, selection of criteria for distinguishing months with large temperature anoma over the U.S.S.R. and for formation of large temperature anomalies for winter. The practi construction of forecasts according to the following methods is considered, viz: the forecast mean monthly atmospheric temperature anomaly 1) on the basis of the development of a typ circulation pattern together with an analysis of the circulation indices and the forecast indicati according to balance computation of air mass currents on the 25th of the preceding month; on the basis of balance computations of the air mass for the last 5-day period of the preced month and AT_{500} anomaly maps for the forecast month; the forecast is corrected at the beginn of the month in necessary cases and the final forecast is then prepared. Actual forecasts are m and verified and data and synoptic maps are presented. *Subject Headings:* **1. Mean mont atmospheric temperature anomalies 2. Temperature anomaly forecasting 3. U.S.S.R.**—*I.I.*

12L–443 551.509.33:551.524.3:523

Khrabrov, Iu. B., **Nekotorye voprosy ucheta solnechnoi aktivnosti pri sostavlenii mesiachn pogody.** [Problems of accounting for solar activity in preparing monthly weather forecas *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 71:11–16, **1958.** 3 figs., 9 refs. **DLC**— analysis of the temperature anomalies during 1956 as indicated by the number of cases of in monthly variability of temperature greater than 6° at a series of Soviet weather stations and comparison of the frequency of interdecadal differences of mean temperature at Moscow du 1947–1954 and 1955–1957 indicates that the increased intermonthly differences of air tempera in 1956 was associated with variations in solar activity which had begun in the second half of 1 An attempt is made to utilize variations in solar activity to make 30-day forecasts. This invo the determination of atmospheric temperature anomalies to characterize the general backgro which synoptic processes take place over a large interval of time, in the construction of an an to the current processes. From data of 17 stations of European U.S.S.R. and north of We Siberia there were selected years with analogous distribution of temperature anomalies durin months preceding the starting month. The comparison of temperature anomalies for each y analog is made by means of $A_i = \sum_{1}^{n} \sum_{i=1}^{12} \frac{(t_1 - t_{ij})}{\sigma_i} - k$ where t_1 = anomaly of mean monthly air perature during the months of the starting year, t_2 = anomaly of mean monthly air temperature ing the months of the year-analogs, σ_i = mean square deviation of the mean monthly air temper for a given station in a given month, n = number of stations chosen for evaluation and k = a stant. A comparison of A_i with the visual evaluation of analogy of mean monthly temper anomalies shows that these are mirror image relationships. A further representation analogy complished by means of the formula, $F = \frac{1}{N} \sum e^{-\frac{1}{4}\delta^2/\sigma^2}$, where $\delta = T_1 - T_2$ = forecast error of air monthly temperature and N = number of stations. It is shown that anomalies of mean mo air temperature in the year-analog should be similar to temperature anomalies in months of th

rent year in no less than 7 times out of the 12 preceding months and the temperature anomalies in the initial month of the year-analog should be analogous with temperature anomalies in the beginning month of the current year. The validity of the procedure is illustrated by means of actual examples. *Subject Headings:* **1. Monthly weather forecasts 2. Solar relationships 3. Temperature anomalies 4. European U.S.S.R. 5. Western Siberia.**—*I.L.D.*

12L–444 551.509.33:551.524.32:551.577.32(71)

*McClellan, D. E., **Monthly temperature and precipitation limits for use in 30-day forecasting.** *Canada. Meteorological Branch, CIR*-3117; TEC-283, Oct. 27, 1959. 16 p. numerous tables, 4 refs. **DWB, DLC**—Twice monthly reports of the Canadian Weather Bureau giving temperature and precipitation for the following 30 days. Variation of temperature class limits from station to station where shown. To obtain the necessary limits, the thirty-five values of monthly precipitation were arranged in order of magnitude. It is noted that there is greater monthly variability of temperature in central continental regions. There is more precipitation in the west. The tables include data from many Canadian cities. *Subject Headings:* **1. 30-day forecasting 2. Monthly temperature limits 3. Monthly precipitation limits 4. Canada.** —*A.H.K.*

12L–445 551.509.33:551.577.32(52)

Mizuno, T., **An example in the statistical treatment of the season.** *Journal of Meteorological Research,* Tokyo, 10(7):625, July 1958. In Japanese. **DLC**—A statistical method is used to determine seasonal weather characteristics and the inclusive dates of the season with the data of Bai-u in Tokyo for 75 yrs and Kochi for 62 yrs during May–July. The conclusions are briefly summarized. The steps of analysis are as follows: (1) divide a year into smaller units of duration, (2) select characteristic data in each unit, (3) estimate prevailing characteristics from the statistical treatment of data within the small unit duration with reference to a fixed standard, and (4) average initial and conclusive dates of a group of small units durations having continuous common prevailing characteristics to be considered a season. *Subject Headings:* **1. Seasonal weather characteristics 2. Long range forecasting 3. Tokyo Japan 4. Kochi, Japan.**—*J. H. Woo.*

12L–446 551.509.33:551.542:551.524.3

Mohri, K. [*comp.*], **On the variation of pressure and temperature fields from the viewpoint of 10-day weather forecasting.** *Journal of Meteorological Research,* Tokyo, 10(4):296–335, April 1958. 63 figs., 7 tables, 23 refs. In Japanese. **DWB**—A tentative analysis and the results of research on the transition of the weather base in the five divisions of Japan, based on a number of articles reported previously in this *Journal,* has been carefully compiled. Principal areas and research on important factors in the transition of the weather base are as follows: 1) On the long and short wave trough in Osaka, Fukuoka, Nigata, Hiroshima, Sapporo, Maisturu, Hakotate, Sentai and Honcho areas, with tables and figures. 2) On the thickness of isobaric surface in the Honcho and Haneta areas with a table and figures. 3) Systematic chart on high pressure advection and Sentai, Takamastu and Fukuoka areas with figures. 4) On isopleth of 500 mb, 700 mb, and 850 mb in Nagoya, Kobe, Fukuoka and Hiroshima areas with figures. 5) On the relation of divergence and base, Nigata area with figures. No exact date is given, but charts and statistics used in this article showed data relative to the years from 1952–1956. The definition of the word "base" is not clear, however, it is used to represent the characteristic of weather in a natural period, implying the first approximation to weather and generally in a broader sense. *Subject Headings:* **1. 10-day weather forecast 2. Pressure field variations 3. Temperature variations 4. Japan.**—*K.C.*

12L–447 551.509.33

Nagao, T., **Characters of weather group and its application to long-range weather forecasting, Pt. 9.** *Journal of Meteorological Research,* Tokyo, 7(11)726–733, Dec. 1955. 7 figs., eqs. In Japanese; English summary p. 726. **DWB, DLC**—In this paper, one of several which aim to study the weather group from statistical and dynamical points of view, the problem using a model cyclone after J. Bjerknes is examined. First the pressure and temperature distribution following the passage of cyclone group which is defined by the pronounced cyclogenesis are calculated, and next the pressure and temperature change due to cyclone group passage are analyzed. The results are as follows: 1.The monthly mean pressure gradient is smallest along the line through which cyclone centers pass successively. 2. The maximum value of monthly mean temperature gradient locates south of the track of cyclone, and its deviation from the cyclone track is small in the initial stage of cyclone development, and becomes larger with the cyclone development. 3. The horizontal heat transfer perpendicular to the cyclone track is proportional to the

magnitude of interdiurnal variability of temperature. 4. The relation between cyclone stage a shape of correlogram of daily mean temperature is discussed. 5. The relation between cyclo stage and moment of temperature distribution of daily mean temperature is discussed. *Subj Headings:* **1. Long range forecasting 2. Weather types**—*Author's abstract.*

12L–448 551.509.33:551.524.32(521.4

Niigata District, Japan. Meteorological Observatory, **On the extended forecasting of t air temperature at Niigata in winter.** *Journal of Meteorological Research,* Tokyo, 9(4):27 283, June 1957. 8 figs. In Japanese. **DWB, DLC**—On the basis of "flowing base" at 700 the temperature base was sought through the variation and inflow-development of cold from l autumn to winter. In Niigata it was proved that the cold moves toward the south as the posit of the major trough lies in 140–150°E, contrary to that which moves toward north near 130° Using a deviation chart of mean daily temp. and main trough at 700 mb in mainland of Japan a that at 140°E in Nov. 1955 in Niigata and with a discussion of short trough and ridge formati a comparative study is presented of air temp. at 700 mb in Niigata, Wajima, and Siberia, incl ing the areas of Irkutsk, Chita and Nabarovsk. A figure shows a method for forecasting main trough. It is concluded that the measured value for 3–4 days of temp. at Irkutsk can m possible forecasting of temp. in Niigata. *Subject Headings:* **1. Temperature forecasting Niigata, Japan.**—*K.C.*

12L–449 551.509.33:551.509.318:551.524

Ped', D. A. and Al'tverger, R. M., **K prognozu tempertury vozdukha na estestven period.** [Forecast of air temperature for the natural synoptic period.] *Moscow. Tsentral' Institut Prognozov, Trudy,* 73:94–99, **1958.** 9 refs., 4 eqs. **DWB**—Forecast of the air t perature for 5–6 days in advance is important for many national organizations. Various fo casting methods, adopted in Germany, Japan and the U. S. are analyzed to determine their re bility. The characteristics of these methods are not sufficient in operational works, there the solution of the problem of the reliability of forecasting with established methods can evaluated in a synoptic-statistical manner. It is shown that the forecast of the macroprocesses general character 3–6 days in advance can be based on analogy with an evolutionary pro prevalent in the representative region and also in the Northern Hemisphere. A synoptic proc which is analogous, according to distribution and evolution of the thermobaric fields with process under consideration, can be forecast for 3–6 days. The selection of the analogy n be made from identical materials. The determination of degree of similarity of the meteorolog elements by analog methods is described in detail and with special attention to air temperat and their anomalies. The sign and magnitude of the air temperature anomaly during nat synoptic periods can be forecast with sufficient reliability for cases when deviation in anomal ($\Delta t \geqq 3°$). A sufficiently large number of cases under analysis, all initial (ti) natural sync periods and the analogs (t_{an}) for them are divided into 3 groups: (a) $t_i \approx t_{an}$; (b) $t_i > t_{an}$ (c) $t_i < t_{an}$ and the regression equation will be used for each case for determination of tempera for future natural synoptic periods. *Subject Headings:* **1. Long range temperature forec ing 2. Natural synoptic periods.**—*N.P.S.*

12L–450 551.509.33

†Radok, U. (*Dept. Met., Univ. Melbourne*), **Long range forecasting research in Austr** (In: Pan Indian Ocean Science Congress, Aug. 1954, Perth, Western Australia, **Proceeding Section A, Physical Sciences,** (pub. 1958?), p. 14–27. 68 refs.) **DWB** (506.35 P187p Two major types of long-term studies of weather changes in Australia have been investigated analyzed, using the periodicity and the correlation approaches. The author discusses the considerations in these and in addition considers the limitations of the circulation approach. *ject Headings:* **1. Long range forecasting 2. Australia.**—*N.N.*

12L–451 551.509.33:551.553.21:551.577(

*Rao, K. N. and Ramamoorthy, K. S. (*both, Regional Met. Centre, Bombay*), **Seasonal (r soon) rainfall forecasting in India.** (In: Symposium on Monsoons of the World, New D Feb. 19–21, 1958, **[Proceedings].** New Delhi, **1960.** p. 237–250. 5 figs., 7 tables, 3 refs, **DWB** (M53.21 S989sy)—Seasonal forecasting of rainfall though a subject of great compl has attracted considerable attention all over the world from very early times. Notable a the countries where the seasonal forecasting of rainfall has been practised for many yea India. The first official forecast was issued in 1886. The correlation method introduce WALKER in 1907 is still the basis of practice followed for issue of seasonal forecasts in I After a brief description of the salient features of India's rainfall, the paper contains a discu of the performance of each of the factors in use in the various seasonal forecasts. It is i esting to observe that South American pressure and south Rhodesia rain continue to b

dominant factors in the seasonal forecasting formulae. A table giving particulars of the seasonal forecasts issued at present has been included. Reference has also been made to the influence of sunspots on Indian rainfall. *Subjct Headings:* **1. Seasonal rainfall forecasting 2. Monsoon forecasting 3. Rainfall distribution 4. Solar influences on rainfall 5. India.**—*Authors' abstract.*

12L–452 551.509.33:551.553.21(540)

Roy, A. K. (*C. S. I. R., New Delhi*), **On the usefulness of pressure departure charts in forecasting monsoon weather** [abstract only]. (In: Symposium on Monsoons of the World, New Delhi, Feb. 19–21, 1958, [**Proceedings**]. New Delhi, **1960.** p. 173.) **DWB** (M53.21 S989sy)—Despite the broadly seasonal nature of wind flow, as implied by the word 'monsoon,' daily weather and rainfall over India and the adjoining seas during the southwest monsoon season is by no means uniform. Marked variations occur in the monsoon activity generally and, in particular, in the distribution of rainfall over different parts of the country, being results of perturbations superposed on the mean circulation of the season. One useful tool for the study of such perturbations and associated rainfall distribution is provided by charts given departures from normal of surface pressures, prepared regularly in India for forecasting purposes. The main uses of these charts in foreshadowing readily the expected rainfall pattern in the following 24 hours on the basis of studies of weather types, locating areas of widespread and heavy rainfall, and in attempting, in certain situations, a fairly extended range of forecast of possible developments in monsoon activity, are discussed briefly in the paper. *Subject Headings:* **1. Monsoon forecasting 2. Rainfall distribution 3. Pressure charts 4. Monsoon symposia 5. India.**—*Author's abstract.*

12L–453 551.509.33:551.509.53

Sapporo District. Central Meteorological Observatory, **On the weekly temp. forecast at Sapporo.** *Journal of Meteorological Research,* Tokyo, 9(4):269–271, June **1957.** 4 figs. In Japanese. **DWB, DLC**—Forecasting of air temp. is possible by following trough motions since these are closely related. When the observation was made at Hokkaido, it was found that in the vicinity of 90°E the wave traveled irregularly with the irregularity of air temp., contrary to the situation east of 90°E where the trough motion was very weak. As shown in a figure, the variation curve of air temp. at 700 mb between 56°N and 93°E (called the Russian zone) and Sapporo shows an interrelated motion, in addition to the method for correction of lag, order and period air temp. and class. Taking the trough-ridge diagram and isopleth at 700 mb (along 60°E and 140°E) into the consideration of trough motion, a concise analysis shows the error of forecasting passage, inflow of cold air, and the seasonal characteristics. The continuity chart and upper variation curve are shown. The combination of trough and air temp. has two advantages for forecasting; one is in the longer range and the other is in the ease of constructing the weather chart. *Subject Headings:* **1. Temperature forecasting 2. Trough movement 3. Sapporo, Japan.**—*K.C.*

12L–454 551.509.33:551.509.318(47,571)

Shishkov, V. G., **Metodika sostavleniia mesiachnikh prognozov pogody na osnove povtoriaemosti sinopticheskikh protsessov.** [Methodology of preparing monthly weather forecasts on the basis of frequencies of synoptic processes.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 71:17–26, **1958.** fig., 8 tables, 12 refs. **DLC.** Transl. into English available. **DWB** (M09.335 S558me)—The author proposes a method of long range forecasting based upon the rhythm of synoptic processes associated with periodic waves in the atmosphere. The fundamental forecasting assumptions of this method are as follows: If, for 90 (150) days up to the natural synoptic period serving as a point of departure, a natural synoptic period with an opposite distribution of pressure waves is observed over the area from the western coasts of North America to the Yenisei basin, then a process opposite to the initial process can be expected 90 (150) days after the initial process over the first natural synoptic region. If 90 (150) and 45 (75) days from the initial synoptic period, there are observed synoptic processes (over the area from the west coast of North America to the Yenisei) analogous and opposite to the initial period, then over the territory of the first synoptic period an opposite synoptic process can be expected 45 (75) days after the first initial process and an analogous process after 90 (150) days. In making 30-day weather forecasts, use is made of empirical rules of the frequency of synoptic processes which provide indications of the development of macroprocesses during various time intervals in the course of the month for which the forecast is made. It is shown that the analogousness of one natural synoptic period cannot be extended to the subsequent period so that the analogousness macroprocesses according to a given criterion even over a large area does not bring about analogousness of succeeding natural synoptic periods. Macroprocesses opposite

the initial natural synoptic period can be succeeded in the adjacent period of synoptic proces that are either analogous or non-analogous to them. Even the most thorough selection of anal for the first and third natural synoptic periods does not increase the analogousness of the sec natural synoptic period. Finally an extended analogousness raises the analogousness of s ceding natural synoptic period in comparison with analogousness from one or two natural syno periods. A concrete example of the preparation of a 30-day forecast is presented. The crite for the success of a forecast, the reliability of forecasts of anomalies of mean monthly atmosphe temps. over the U.S.S.R. and Western Siberia and of various indications of development atmospheric temps. are discussed. *Subject Headings:* **1. Long range forecasting 2. Synop processes 3. U.S.S.R. 4. Western Siberia.**—*I.L.D.*

12L–455 551.509.33:551.509.

§Similä, Artturi, **Veckoprognosmetoder,** [Methods of weekly forecasts.] *Sweden. M orologiska och Hydrologiska Institut. Meteorologiska Byran, Notiser och Preliminära Rappo* 2(4), **1959.** 19 p. 11 figs. **DWB** (M(055) S947no)—Weekly forecasts of mean temperat wind direction and precipitation began on an experimental basis in Sweden in 1951. As of 1 the regular weekly prognoses covered Swedish waters, as a service to the ice-breaker service, public water supply and industry. Detailed description of the circulation method is given. method is based upon daily hemisphere relative topography charts for the 1000–500 mb re and involves the temperature conditions of the polar cap. The latter leads to a new techn concept "the thermic polar cap" i.e., the coldest area of the northern part of a constant are 100 sqm, or in other words approximately the region north of 63°N. Tabulated results of temperature for the individual winters 1956–1959 at the control stations and the coastal regions are given and shown to have a mean accuracy of 77.5. Graphical presentation of an variations (1949–1956) of the cold temperatures of the polar cap, departure from mean (19 cold air distribution etc. are given along with other pertinent data on maps. *Subject Headi* **1. Weekly forecasts 2. Thermic polar cap 3. Sweden.**—*W.N.*

12L–456 551.509.33:551.511.32:551.52

§Smirnov, I. P., **Opyt sostavleniia dolgosrochnykh prognozov srednikh mesiachnyk dekadnykh anomaliĭ temperatury dlia severnogo polusharia Zemli.** [Preparing long-r forecasts for mean monthly and decadal temperature anomalies for the Northern Hemisph *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.,* No. 12:1828–1846, Dec. **1960.** 8 figs., 2 ta 6 refs., 19 eqs. **DLC.** Transl. into English in the corresponding number of its *Bulleti the Academy of Sciences, USSR, Geophysics Series.* **DLC**—A large amount of new aerolo data obtained during 2½ years of the IGY are used for improvement of the hydrodynamic range forecasting of air temperature anomalies. The set of differential equations are used expanding series of Legendre polynomials for preparation of temperature anomalies at diff altitudes. The results of practical examples are tabulated and plotted on the 18 synoptic r *Subject Headings:* **1. Long range forecasting 2. Monthly temperature anomalies 3. N ern Hemisphere.**—*N.P.S.*

12L–457 551.509.33:551.579.4:551.482.2(282

Sokolov, A. A., **O vozmozhnosti dolgosrochnogo prognoza godovogo stoka rek s ozer regulirovaniem.** [Possibility of long range forecasting of the annual discharge of rivers lated from a lake.] *Leningrad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy,* No. 53(1 114–127, **1956.** 7 figs., 6 tables. **DWB** (M(055) U581tr)—The most favorable condition long range hydrological forecasts obtain for lake rivers because the inertia of runoff incr with increased natural regulation of the discharge by the lake. The possibilities of long forecasting are investigated for Vuoksi River, which flows out of Lake Saimaa. The meth longe range forecasting of annual flow of rivers with extensive natural regulation is divided two stages: (1) development of a method of computing the part of the annual flow depe exclusively upon the preceding water content of the basin or the basic flow—Y and (2 method of forecasting the annual flow associated with the precipitation of a given year Y_a. procedure for investigating the regulating inertial properties of the Vuoksi River basin, fo termining the curve of decline and the computation of coefficients characterizing the depen of river flow upon precipitation is described, and curves showing the hydrograph of flo individual preceding years, the hydrograph of the curve of decline, the relationship of discharge of the Vuoksi River with the mean discharge of preceding years, the curve o cline of the Vuoksi River, numerical data giving the observed and computed ($Y_{1v-v111} = 0$ $+ 0.54_{n-1} + 0.19_{n-2} + 0.07x_{n-3} + 0.01x_{n-4} - 23.2$) annual flow of the Vuoksi River, and the r of verified annual forecasts of the river flow, are presented. Appendices contain the monthly discharges of the Vuoksi River at the source from Lake Saimaa, and monthly and a

recipitation in the Vuoksi River basin. *Subject Headings:* **1. Long range river forecasting 2. Vuoksi River Basin, Leningrad Oblast, U.S.S.R. 3. Lake Saimaa, Finland.**—*I.L.D.*

12L–458 551.509.33:551.524.32

Spirina, L. P. **O vozmoshnosti inertsionnykh prognozov mesiachnykh anomaliĭ temperatury vozdukha.** [Possibility of forecasting monthly anomalies of atmospheric temperature on the basis of persistence.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 67:32–39, **1959.** 2 figs., 5 tables, 7 refs. **DLC**—The condition of present long range forecasts is at a low level. Therefore, it is necessary to employ all additional means which may contribute to forecasting: climatological and synoptico-climatological work in the form of long range forecasts, not as basic but as auxiliary forms of forecasting. The present study seeks to utilize meteorological persistence for the forecasting of monthly air temperature anomalies. A discussion of previous work in this field follows. A justification for this form of forecasting is developed on the basis of percentages. It is suggested that similar work be undertaken over a larger territory so that the results may be applied to long range forecasts. *Subject Headings:* **1. Monthly temperature anomalies 2. Long range forecasting**—*N.G.*

12L–459 551.509.33

Sugaya, S., **On the 10-day forecasting by "isopleth method."** *Journal of Meteorological Research,* Tokyo, 9(4):284–286, June **1957.** 3 figs. In Japanese. **DWB, DLC**—The different methods for the construction of isopleths were analyzed as shown in two figures. Two of the peculiarities explained in this paper are: the trough south of 50°N; second, date marked on horizontal axis and latitude on vertical axis, whereas, cyclone, anticyclone and trough were recorded on chart. The cause of opposition to the passage of trough, migratory speed, and cyclones were discussed. *Subject Headings:* **1. 10-day weather forecasts 2. Isopleth forecasting method.**—*K.C.*

12L–460 551.509.33

Takenaga, K., **Consideration on the use of 700 mb zonal isopleth and continuity chart in a week forecasting.** *Journal of Meteorological Research,* Tokyo, 9(4):292–296, June **1957.** 4 figs., 2 refs. In Japanese. **DWB, DLC**—When one-week forecasting is practiced, the passage of cyclone and anticyclone and short wave has to be checked so as to draw concrete and time-saving Hovmöller and continuity charts. This is needed for both phase track and stationary wave in the region of westerly wind. However, the important thing in using both charts is to investigate the variability of the "base" that is closely related to that of the "long wave." Two figures based on the same period (November of 1955 to January of 1956) are shown; one is on the variation of isobaric surface at 700 mb at 52°N and the other is on temperature variation. It is discussed in order to prove the possibility of track of wave motion, trough and ridge of stationary base, and the method for the use of charts in which are included a blocking, cold advection, and low and high temperature phenomenon. Explaining the correlation between temperature at Fukuoka and their pressure at Lake Baikal for the illustration of the above study, it was concluded that the presumption of width and intensity of westerly wind and of latitudinal variation is the key to forecasting for one week (Figure 4). *Subject Headings:* **1. 700 mb charts 2. Weekly forecasts 3. Fukuoka, Japan.**—*K.C.*

12L–461 551.509.33:551.326.7(261.3)

Tiutnev, Ia. A.; Gracheva, N. A.; Sidel'nikova, T. M.; Smirnova, K. I. and Iushchak, T. F., **Metod dolgosrochnykh prognozov osennikh i vesennikh ledovykh faz na Baltiiskom more.** [Method of long range forecasting of autumn and spring ice phases in the Baltic Sea.] *Moscow. Tsentral'nyiĭ Institut Prognozov, Trudy,* No. 57:83–97, **1957.** 2 figs., 3 tables, 3 refs. **DLC**—Various attempts to make long range ice forecasts for the Baltic Sea, in particular those of V. Iu. Vize, P. A. Shirkin and G. S. Ivanov are summarized briefly. In this study the author utilizes the circulation index over the North Atlantic as compared by H. A. Belinskiĭ to forecast the mean monthly temperature over various areas of the Baltic Sea and to relate the latter to predict the dates of ice breakup and ice clearance of the coastal areas. The synoptic-climate characteristics of the Baltic Sea in particular, the relationship of atmospheric circulation processes to freezing and ice clearance, the factors influencing the heat balance of the sea, and the relationship of extreme ice conditions to the total atmospheric circulation index (as shown by charts of isoanomalies of total atmospheric circulation index) are discussed. Formulas are presented for forecasting the dates of ice breakup and ice clearance in the Baltic Sea. These formulas provide relationships for forecasting dates of ice breakup and clearance as much as 2½ months in advance. *Subject Headings:* **1. Long range ice forecasting 2. Ice breakup forecasting 3. Baltic Sea.**—*I.L.D.*

12L–462 551.509.

*§Tsepkanova, E. I. and Ur'eva, B. R., **Prognoz obshcheĭ kharakteristiki pogody mesiats.** [Forecasting general weather character for a month.] *Moscow. Tsentral'nyĭ Institu Prognozov, Trudy,* No. 71:3–10, **1958.** 2 figs., 6 tables, 5 refs. **DLC**—Using synoptic process for the 19 year period 1938–1956 and analyzing according to mean period, RT100–500 chan synoptic, kinematic and atmospheric temp. anomaly charts for each season the author establish the boundaries of the season as a whole and of individual parts of the season. The relationsh between the distribution of the sign of atmospheric temp. anomaly during the first natural synop period of a beginning part of a season and its values during all parts of the season was determin from data for the period 1950–1956. The forecast of the general character of the developme of a macrosynoptic period over a 30-day period is based upon the relationship established betwe development of synoptic processes on the surface of the earth and the distribution of temp. the troposphere (K. I. Kashin and M. V. Gritsenko (*see* 11.2–112, Feb. 1960, *Met. Ab* The determination of the influence of the mean temp. layer upon the formation and developm of pressure system for the period 1938–1956 is described and forecast rules are derived. Th are: (1) If the prevailing process of the initial part of a season is characterized by one of following sources (a) meridional or polar activity or (b) stationary anticyclones of the cold h of the year, (c) isolated cyclones and positive anomalies of mean monthly temp., then, during transition to the following part of the season, the sign of the pressure field and the correspond temp. vary over the entire territory in 75% of the cases, over half of the territory in 23% the cases and the pressure field is conserved in the following part of the season in 2% of cases. If during given processes over northern seas and partly over the continent, negat anomalies of mean monthly atmosphere temps. prevail, then in the following large scale proc the pressure does not alter or alters only slightly in other regions in 70% of the cases the p sure is conserved in 16% of the cases and varies considerably in 14% of the cases. If prevailing processes of the initial part of the season are characterized by zonal transport in h latitudes, by the invasion of southerly cyclones and by stationary anticyclones in summer t the transition to the following part of the season is conserved over the entire territory in 7 of the cases and in over half of the territory in 17% of the cases and is altered considerably 7% of the cases. Synoptic maps illustrating these rules and data on verification of the r of transformation of the processes of part of a season in the presence of the listed conditions presented. *Subject Headings:* **1. Monthly weather forecasts 2. Macrosynoptic periods.**—*I.*

12L–463 551.509.33:551.52

*Vorob'eva, E. V., **O prognoze znaka anomaliĭ srednikh mesiachnykh temperatur vozdu na iugo-vostoke Evropeĭskoĭ territorii SSSR.** [Forecasting the sign of monthly mean atm pheric temperature anomalies in the southeastern European U.S.S.R.] *Leningrad. Glav Geofizicheskaia Observatoriia, Trudy,* No. 87:10–31, **1959.** 11 figs., 11 tables, 6 refs. **DL** This study is divided into five parts: 1) general statement of the problem, 2) certain relation the sign of monthly anomalies with the basic forms of circulation of the atmosphere in a g month, 3) forecasting dependencies, 4) construction of correlated forecasting graphs, 5) evalua of results obtained. The study seeks to establish certain diagnostic and prognostic relat between monthly temperature anomalies and separate characteristics of the circulation reg First of all, groups of anomalies opposite in sign and of large size were selected. This was because sharply opposing anomalies must be caused by substantially differing processes. was done for the station of Astrakhan. The whole methodology of long range forecastin established on the hypothesis that the processes determining this or that character of weathe not appear suddenly but are prepared over a period of time. A number of tables (variation the mean number of days with differing forms of circulation, probability of signs for mon anomalies for the various forms of circulation), graphs (variation of mean number of days main forms of circulation), and statistical figures (relation of sign of monthly anomalies to number of western and eastern type days) are used to illustrate the discussion. The author cludes that the forecasting elements selected were not accidental. The circulatory peculiaritie forecasting months are determinants of processes directed toward anomalies of a certain *Subject Headings:* **1. Long range forecasting 2. Monthly mean temperature anomalies Astrakhan, European U.S.S.R.**—*N.G.*

12L–464 551.509.33:551.553.21(52

Watanabe, T., **Forecasting monsoon at Fukuoka.** *Journal of Meteorological Rese* Tokyo, 10(9):806–809, Sept. **1958.** 8 figs. In Japanese. **DWB, DLC**—An analytical s of surface weather charts and upper-layer charts at 700 mb was made on the basis of data 10 minutes mean wind speed (10 m/sec) for the months of January, February, March, Nove and December, 1951 through 1956. Monsoons were classified: monsoon, gust, mixed ty

monsoon and gust, variation by long hours, and by short hours, and they were also classified into five types according to wind directions as well as by the position of cyclone-anticyclone. The investigation of weather chart at 700 mb is concerned with a cold trough and a flat cold trough. *Subject Headings:* **1. Monsoon forecasting 2. 700 mb charts 3. Fukuoka, Japan.**—*K.C.*

12L–465 551.509.33

Wei, Y. H., **A summary of the study of long-range weather forecasting.** *Meteorological Bulletin*, Taipei, Formosa, 2(3):5–14, Sept. **1956.** 11 figs., 6 refs. In Chinese. **DLC** (Orientalia)—An introductory summary of methods of long range forecasting, including statistical, analogical, and theoretical. The last one, however, in this paper, has concentrated on the assumption of the most familiar method in America and was divided into three fields: anomaly chart in various sorts of earth surface and upper layer; time mean chart as five-days forecasting; single and double space mean chart. The historical cource of development, change, initiators, methodology, procedure for drawing charts and a biographical sketch are included. *Subject Heading:* **1. Long range forecasting.**—*K.C.*

Methods of Correlation in Space or Time (551.509.331)

12L–466 551.509.331:551.326.83

Makarevich, T. N. and Mytarev, N. M., **O vozmozhnostiakh dolgosrochnogo kolichestvennogo prognoza ledoobrazovaniia na rekakh Severo-Zapada Evropeĭskoĭ territorii SSSR.** [The possibility of the long-range quantitative forecast of ice formation on the rivers of the northwest European area of the U.S.S.R.] *Meteorologiia i Gidrologiia*, Leningrad, 9:20–24, **1957.** 3 figs., ref. **DWB, DLC**—Ice conditions on the rivers of the Northwestern part of European U.S.S.R. (especially in northern Karelia and on the Kola Peninsula) are characterized by interrupted and repeated ice blockades. Forecasts of ice formation which must be made in the first or second decade of October is based upon September data. The two methods of forecasting the start of ice formation which are based (1) upon charts of monthly mean absolute geopotential at the 500 mb surface and (2) upon ground surface charts of monthly mean pressure for September and October are described. Graphs are presented showing the relationship between the indices of baric topography and dates of beginning of appearance on rivers in deviation from the norm and the relation between the dates of beginning of ice appearance with mean pressure for Oct. and Sept. in deviations from the norm for specific rivers. *Subject Headings:* **1. Long range ice forecasting 2. River ice 3. Ice formation 4. Northwest European U.S.S.R.**—*I.L.D.*

Patterns of Circulation (Long Waves) ("Grosswetterlagen") (551.509.334)

12L–467 551.509.334:551.589.1(4)

Baur, Franz; Hess, Paul and Nagel, H., **Die Grosswetterlagen Europas im Frühling; Ein Beitrag zum Aufbau einer Grosswettersynoptik.** [General weather situations in Europe during spring.] *Germany. Reichsamt für Wetterdienst, Forschungs und Erfahrungsberichte, Ser. B*, No. 12, **1943.** 24 p. charts, graphs, tables. Photostat. **DWB**—The author describes the individual weather situations, namely: high on the edge of Western Europe; high pressure, cols between an Atlantic high and continental high; the central high over almost of all Europe with its nucleus over the continental middle latitudes; the central low in the vicinity of Iceland with its extension toward Central Europe; the central low in the vicinity of the British Isles; the central low over continental western Europe or central Europe; the southwest weather situation; the southern weather situation, the northern weather situation; the northwest weather situation and the eastern weather situation. Also the most frequent transitions between the general weather situations and the frequency of the individual weather situation and their temperal varieties are considered. Example of the average pressure distributions in the individual general weather situations are given. *Subject Headings:* **1. Synoptic meteorology 2. Grosswetterlagen 3. Europe.**—*I.L.D.*

12L–468 551.509.334:551.577.32(511)

*China. Central Bureau of Meteorology, **First steps in research for extended range forecasting of rainfall in summer in Eastern China. Peking, Dec. 1956.** 72 p. 48 figs., tables. In Chinese. Title romanized, **Wo-kuo tung-pu hsia-chi chiang-shui chung-chii yü-pao ti ch'u-pu yen-chiu.** "National Academy of Science and Central Bureau of Meteorology, in cooperation, in the Weather Analysis and Forecasting Center. . . ." **DWB** (M09.33 C539wo)—An experimental study of the application of B. P. Mul'tanovskiĭ and S. T. Pagava's theory on the extended range weather forecasting of large scale weather developments in Eastern China is discussed. Extended forecasting of summer precipitation in Eastern China are discussed with

several sample experimental studies. General Asiatic summer air circulations, several fun mental facts pertaining to natural Asiatic weather districts and weather developments, seve important points of divisions of Asiatic weather periods, general experimental rules of peric forecasting, characteristics and forecastings of special weather systems according to Asi natural weather districts, Eastern China summer season rainfall and its forecasting, and sam cases of Asiatic extended weather forecasts are discussed. The appendix contains a table of ov all natural weather periods from 1951–1954. *Subject Headings:* **1. Long range rainfall fo casting 2. Mul'tanovskiĭ's method 3. Eastern China.**—*J. H. Woo.*

12L–469 551.509.334:551.51

§Clapp, Philip F., (*Extended Forecast Section, U. S. W. B., Wash., D. C.*), **The evolut of the general circulation, Jan.–Feb. and July–August 1949.** (In California Univ. at L. Dept. of Meteorology, Contract AF 19(604)-1286, **Final Report,** June 1957. Article 1 (38 47 figs., 20 refs.) **DWB**—Northern Hemisphere synoptic processes during January–Febru and July–August, 1949 are analyzed using the methods of the U.S.W.B. Extended Forecast section (5 day mean circulation developments and their physical and kinematical aspects, effect continents, oceans and mountain ranges, etc.). Numerous sea level and 700 mb charts, anom charts, etc. are included. *Subject Headings:* **1. General circulation studies 2. 5-day m charts.**—*M.R.*

12L–470 551.509.334:551.577.38(7

*†Friedman, Don G., **The prediction of long-continuing drought in south and southw Texas.** *Travelers Weather Research Center, Occasional Papers in Meteorology,* No. 1, S 957. 182 p. 37 figs., 11 tables, 172 refs., eqs. **DWB** (M77.38 F911pr)—This is a quantita study on the prolonged drought problems in the south and southwest areas of Texas in the 70 years, during which time there occurred 4 serious droughts. This volume contains informa on the prediction of long continuous droughts in the area and provides an index of the m orological factors involved. It is concluded that there is a relation between the annual rain and the general characteristics of the general circulation in the area but there is no reliable of predicting the annual rainfall. *Subject Headings:* **1. Drought forecasting 2. South Texas.**—*N.N.*

12L–471 551.509

Rozhdestvenskii, A. A., **Opyt statisticheskogo obobshcheniia metoda faz Mul'tanovsk na osnove indeksov tsirkuliatsii.** [Experiment on statistical generalization of Mul'tanovs method based on circulation indexes.] *Leningrad. Glavnaia Geofizicheskaia Observato Trudy,* No. 76:113–119, **1958.** 2 figs., table, 4 refs. **DWB**—The author reviews the histor the development of long range forecasting in Russia giving a summary of the concepts and cedures developed by S. D. Griboedov during the period of 1908–1912 and by B. P. M TANOVSKIĬ in subsequent years. Using the system of zonal and meridional indices the au presents an attempt to generalize MUL'TANOVSKIĬ's phase method in order to obtain an ide the continuous development of synoptic processes. For this purpose the author selected insta of the largest temperature anomalies in Leningrad, observed during recent years, for which deviation from the normal exceeded ± 5°C and whose duration was at least 5 days. Curve variation of indices for several months preceding the anomalies were constructed for each inst When the curves were superposed they formed a node which could be considered as indicatio those waves which influenced the development of processes in a given direction. It was f that for Leningrad the most characteristic indices in winter occurred at nodes preceding anomaly by 46 and 65 days in the case of the zonal index and by 51 and 55 days fo meridional index. An experimental forecast of atmospheric temperature for Leningrad for second half of Feb. 1956 is presented. The data indicate that over a period of 101 days variation of temperature changes was forecast correctly about 66% of the time. In most the forecast temperature was high in comparison to the actual values. The amplitudes of perature variations were less than the actual in 70% of the cases. *Subject Headings:* **1. I range forecasting 2. Mul'tanovskii's method 3. Leningrad, U.S.S.R.**—*I.L.D.*

Analogue Methods (551.509.335)

See also: **Analogue methods for long range forecasting** (Gōda, Shiota), 12L–439; **Climatic relationships of synoptic processes** (Borisova), 12L–509.

12L–472 551.509.335:551.5

Bagrov, N. A., **Opyt primeniia printsipa analogichnosti dlia prognoza sredneĭ mesia temperatury vozdukha.** [An attempt to use the principle of analogy for forecasting monthly

ir temperatures.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 49:231–249, **1957.** 8 igs., 7 tables, 14 refs., 9 eqs. **DWB, DLC**—The author discusses the principle of analogy and its levelopment, the determination of the index of analogy, of a synoptic process by means of the ormulas $f = e^{-\frac{1}{2}\delta^2/s^2}$ and $f = \frac{1}{N}\sum_i e^{-\delta\delta^2 i/2s^2 i}$ (where δ = difference of the fields of meteorological elenents, φ being compared at a given point $\delta^2 = \varphi_1 - \varphi_2$, s^2 = mean square deviation of a random nagnitude δ, N = number of points); variation of this formula for use for a given calendar date, the ıpplication of analogy to temperature forecasts, correlation coefficients between anomalies of monthly emperatures for Moscow and an example of the preparation of an analogy forecast for November 955. In evaluating the analogousness of atmospheric processes for a territory of the size of the J.S.S.R. it is necessary to embrace the entire continent of Eurasia including the most southerly parts and to use besides temperature also other elements, such as surface pressure. In addition it s also necessary to consider pressure at different troposphere levels. *Subject Headings:* **1. Monthly nean temperatures 2. Analog forecasting methods.**—*I.L.D.*

12L–473 551.509.335:551.577.32

Anido Artiles, Agustín, **Informe sobre las probables características pluviométrices del Presente ano (1957).** [Report on the probable rainfall characteristics of the present year, 1957.] *Cuadernos de Meteorologia,* Santa Clara, Cuba, 1(3):33–37, July **1957. DWB**—On the basis of rends of distribution of precipitation since 1953, it appears that the rainfall in May, June and July is related to that in January and February. The estimate of rainfall for May, June, July of 1957 was reasonable according to the official record. *Subject Headings:* **1. Rainfall forecasting 2. Analog forecasting methods 3. Cuba.**—*E.Z.S.*

12L–474 551.509.335

Böhme, Wolfgang, **Über die Struktur der zeitlichen Verteilung ähnlicher meteorologischer Entwicklungen und Möglichkeiten zur prognostischen Verwendung dieser Struktur.** [Time distribution patterns of similar meteorological developments and possible uses of such patterns in forecasting.] *Zeitschrift für Meteorologie,* Berlin, 13(9/10):249–250, Sept./Oct. **1959.** 2 tables, 3 refs. **DWB, DLC**—Situations showing similar synoptic development are tabulated with a view toward finding patterns of regularity and thereby to examine their practicability. Cases of similar development were determined from sea level pressure values along 60°N, pressure differences between 65 and 50°N, and the character of flow (cyclonic, anticyclonic, mixed) at the surface and at 500 mb. Suspected relationships are analyzed by regression methods and are tested by the Pearson chi-square technique. Valid systematic structures are shown, as well as a high probability of the existence of singularities. *Subject Headings:* **1. Analog forecasting methods 2. Time distribution patterns.**—*R. S. Quiroz.*

12L–475 551.509.335:551.509.318

§*Duletova, T. A. and Komissarova, L. N., **Sviaz' sezonov i ritmichnosti.** [Relation between seasons and rhythmicity.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 51:1–21, **1957.** 8 figs., 3 tables, 3 refs. DLC—The rhythmic activities are analyzed in respect to the stability in development of atmospheric processes during natural synoptical seasons, including high cold cyclones (in troposphere) and warm anti-cyclones as the final processes. Geographic displacement of source of heat or cold and changes in the movement of air masses often distort the seasonal stability in the geographic distribution of processes. These processes affect the analogy in the seasonal order and should be considered as a negative process in the general forecasting. The rhythmicality represents a special form of stability during several months (seven or more). Repetitions in analogy of natural synoptical season are discussed for period 1951–1954 with curves and special marks on the map and with the table for boundaries of natural synoptical season and non-analogical periods. The relation of seasons and their interruption by the rhythmic repetition of processes analogous and opposite to the "repers" is discussed with tabulated data for European Russia for the period 1952 to 1954 and for the combined processes marked on the maps. ("Repers" are initial processes with movements of cool air masses or anti-cyclone cores from the north or from northeast.) Deviation of the analogous processes under effect of the synoptic season are analyzed with graphs and maps. The use of established regularities in the monthly and seasonal forecasting is explained with details and in reference to different localities and "repers." *Subject Headings:* **1. Reperic processes 2. Rythmicity of atmospheric processes 3. Seasonal atmospheric processes 4. Analog forecasting methods.**—*N.P.S.*

Solar Relations (551.509.336)

See: **Solar influences on weather and large scale synoptic processes** (Baur), 12L–142; **Frequency of large scale weather situations within the sunspot cycle** (Cappel), 12L–144.

Climatic Singularities (551.509.338)

12L–476 551.509.338:551.583.15(

Das voraussichtliche Wetter im Winter 1959/60. [Weather predicted for the winter 1959/60.] *Naturwissenschaftliche Rundschau,* Stuttgart, 12(12):467, Dec. 1959. **DWB, DLC**
The weather map of the German Weather Service, Supplement No. 280, contained a long-ran forecast of the weather for the winter of 1959/60 prepared by Franz Baur. The forecast stat that the 1959/60 winter in West, Central, and Northern Europe would be milder than norm To the extent that this does not hold the mean temperature will be only a few tenths of a degr below the normal. The highest probability for milder than usual winter is in Western Euro southern parts of Central Europe, Southern Germany, Czechoslovakia, Austria and Hunga Possibly one or two and in some areas possibly three cold periods of 6–10 days duration w occur and severe frosts will occur in Northern Europe and in the continental part of Cent Europe. *Subject Headings:* **1. Long range forecasting 2. Winter weather forecasting Europe. I. Baur, Franz.**—*I.L.D.*

Single Station Forecasting (551.509.34)

See also: **Applications to objective weather forecasting** (Wan), 12L–523.

12L–477 551.509

Diaz, Emilio L., **Sobre previsión local del tiempo.** [On local forecasting of weathe *Sociedad Científica Argentina, Buenos Aires, Anales,* 170(1/2):3–21, July/Aug. **1960.** fig. tables, eqs. Spanish and English summaries, p. 3.—Weather conditions can be forecast t certain degree through local observation of some meteorological variables. Tables included text, of statistical basis, furnish the probable weather conditions for the next 24 hours; f probability for the following and subsequent nights; and also for rains in the interval 24 hours after observation. *Subject Headings:* **1. Frost probability 2. Local forecasts**—*Auth summary.*

12L–478 551.509

Garnett, Lee, **Instrumentitis.** *Weather,* London, 8(6):165–167, June 1953. **DWB**—Bi humorous article on forecasting at sea with the barometer. *Subject Heading:* **1. Amateur fo casting.**—*C.E.P.B.*

12L–479 551.509.34:551

George, Joseph Johnson, **Procedimientos de pronósticos de nieblas.** [Methods of f casting fog.] *Revista Meteorológica, Montevideo,* 8(29):297–306, April **1949.** 3 figs. **DW** Translation into Spanish by Violeta Costa and Javier Gasperi, of original article in the *Am can Meteorological Society, Bulletin. Subject Headings:* **1. Fog forecasting 2. Translati I. Costa, Violeta** (*transl.*) **II. Gasperi, Javier** (*transl.*).

12L–480 551.509.34:62

*Lippert, Gordon (*U. S. Weather Bureau, Airport Station, Billings, Mont.*), **Billings term forecast study.** Billings, Montana, U. S. Weather Bureau, Airport Station, Oct. **1951.** 2 **DWB** (M09.31 US87b)—After a discussion of topographical influences around Billings Air the general summer and winter conditions are discussed and then the particularly important sou of bady flying weather (low ceiling, and visibility, fog, thunderstorms and high winds) analyzed. Not much data and no "objective" analysis is made, but rather the experience various forecasters in the area is summarized under each heading. *Subject Headings:* **1. L forecast studies 2. Airport climatology 3. Billings, Mont.**—*M. R.*

12L–481 551.509.34:551.50

§Mexico. Servicio Meteorológico, **Estimación del estado del tiempo con los datos a lógicos locales.** [Prediction of the state of the weather from local aerological data.] Me **1945.** 63 p. charts, graphs, tables. **DWB**—Translated by Manuel Lebrija from original lish. A Spanish edition of several articles by Rossby and his staff at the Univ. of Chi wherein single station or multiple station aerological data are used to predict the weather for periods. The use of many of the known aerological charts and diagrams is described and trated by examples from both America and Europe. Weather charts for large areas constr from single station observations are included. *Subject Headings:* **1. Single station forecas 2. Short range forecasting 3. Synoptic analysis 4. Translations. I. Lebrija, Manuel** (*tra* **II. Rossby, Carl-Gustav III. Oliver, V. VI. Boyden, M.**—*M.R.*

12L–482 551.509.34:551.509.8

Rubin, Louis D., **How you can predict weather.** *Travel,* Phil., 102(3): 22–23, Sept. **1954.** photos. **DWB**—Brief illustrated article describing a copyright booklet by author called **How o forecast the Weather,** which is based on cloud and wind signs and other portents. *Subject leadings:* **1. Amateur weather prediction 2. Weather lore.**—*M.R.*

12L–483 551.509.34

Serra, Adalberto (*Met. Service, Brazil*), **Single-station forecasts...(1960?)** 16 p. 10 figs., able, 2 refs., 19 eqs. Mimeo.—A single-station method of long range forecasting was developed. t's theoretical basis is explained and some practical examples, based on long series, fully worked. n conclusion, the new method, supposed promising, awaits new developments. *Subject Headings:* **. Long range forecasting 2. Single-station forecasting.**—*Author's abstract.*

12L–484 551.509.34

Spolton, L., **A great weather forecaster.** *Weather,* London, 7(1):19–20, Jan. **1952. DWB** –Description of weather forecasts by Elijah (Bible, I Kings) and their basis. *Subject Heading:* **'. Weather forecasting.**

Other Forecasts (551.509.39)

12L–485 551.509.39:551.327.7(268)

Bates, Charles C. (*U. S. Navy Hydrographic Office, Wash., D. C.*), **Current status of sea ce reconnaissance and forecasting for the American Arctic.** *Journal of Atmospheric and 'errestrial Physics,* London, Special Supplement, 1957. pub. **1958.** p. 285–322. 27 figs., tables, 4 refs. **DLC**—In 1949 the U. S. Navy began a steadily developing program for observing and orecasting sea ice conditions throughout the American Arctic. In order to illustrate the present tate of the art, a resume is given of a typical monthly briefing of the Commander, Military Sea 'ransport Service, and his staff concerning the existing and probable future ice conditions to be ncountered during the annual resupply of northern bases. Scattered ship or shore reports are ot an adequate basis for stating whether ice conditions were "light" or "heavy" within a given asin. In order to provide the truly synoptic picture of ice conditions existing in the Arctic etween the Bering Sea and Greenland and Newfoundland, a reporting system based on shore nd ship observations has been combined with an extensive aerial reconnaissance program which ow involves flying over 500,000 nautical miles annually. This program utilizes the services of any polar activities, including the Air Weather Service of the U. S. Air Force, the Royal anadian Navy and Air Force, the Meteorological Service of the Canadian Department of Trans- ort, the Defence Research Board of Canada, the U. S. Weather Bureau, and the U. S. Coast uard. Most ice observations are primarily visual and thus semi-quantitative; accordingly, de- elopment work on ice physics and time-lapse photography is also conducted. Freeze-up fore- asting, being based on observed meteorological and oceanographic conditions, is quantitative. owever, metamorphic and advecting processes operating in the ice are less well understood, as re the controls operating in the Western Hemisphere's six major centers of ice disintegration. 'erification values for the 48-hr, 5-day, 30-day ice forecasts and the seasonal outlooks (120–180 ays) are given, and a comparison is made between the accuracy of seasonal outlooks and ice ases. Research projects now under way to provide more quantitative methods include radio- onitored weather buoys placed on the polar pack north of Alaska, and the potential program- ing of high-speed computers to determine movement of ice fields under varying fields of wind nd current. *Subject Headings:* **1. Sea ice forecasting 2. Sea ice reconnaissance 3. Arctic cean.**—*Author's abstract.*

12L–486 551.509.39:551.579:551.577

†Gurevich, M. I., **Prognozy letnego i osennego stoka ravninnykh rek na osnove ego avisimosti to osadkov.** [Forecasting summer and autumn runoff of plains rivers on the basis f its dependence on precipitation.] *Leningrad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy,* o. 53(107):3–113, **1956.** 29 figs., 51 tables, 32 refs. **DWB** (M(055) U581tr)—The forecast- ig of summer and fall stream flow of rivers in plains can be improved by taking into account he genetic relationships between stream flow and precipitation, thereby taking into consideration he loss of precipitation by infiltration and evaporation. In this comprehensive monograph the uthor develops the method of genetic analysis of precipitation and stream flow and a method of onthly forecasts of summer and fall stream flow. The contents of this study comprise the ollowing: analysis of the principles of depletion and determination of the relationship of stream ow upon precipitation involving the characteristics of water content of a basin and its effect pon the formation of stream flow; the characteristics of the depletion of water supplies in a

basin; depletion of total water supplies in a basin, depletion of special replenishments of wat supplies in a basin; integral method of determining the effectiveness of precipitation and t dependence of stream flow upon precipitation. The method of summer and fall river flow fo casting and its application to forecasting the inflow into water reservoirs includes the followin determination of effective precipitation observed at the moment of forecasting, choice of the fo cast period, probability of the character and form of a hydrologic forecast; forecasting of natural monthly inflow into the Kuibyshev Hydroelectric Station; the physical geographic con tions of the formation of summer and fall flow above the Kuibyshev intake; the principal featu of summer and fall stream flow; determination of the natural position of the inflow to Kuibyshev Hydroelectric Station; analysis of the basins of the inflow of the Volga and Ka Rivers during the time of the channel run; determination of the parameters and ordinates depletion curves; choice of forecast period and determination of the position of the actual eff tive precipitation not taken into account; the forecast of monthly river flow and total mont inflow into the Kuibyshev reservoir; examples of forecasting monthly inflow into the reserv of this hydroelectric station; forecasting of the monthly and decadal inflow into the Dnie Hydroelectric Station, of the Dnieper River at Verkhne-Dneprovsk, etc. Formulas, graphs numerical data are presented in relation to the various analyses and forecasts. *Subject Headin* **1. Summer runoff forecasting 2. Rainfall-runoff relationships 3. Kuibyshev, Kuibys Region, U.S.S.R.**—*I.L.D.*

12L–487 551.509.39:551.5

Ives, Ronald L. (*Tromicon, Inc.*), **Water supply predictions in glacially-influenced dra age.** *American Meteorological Society, Bulletin,* 39(4):229–230, April 1958. 2 eqs. **DW DLC**—The necessity to consider the influence of glaciers and snowbanks a plus/minus vari factor in water supply predictions is stressed. A simple, revised formula is offered. *Sub Headings:* **1. Water supply forecasting 2. Glacial runoff.**—*W.N.*

ORGANIZATION OF FORECASTING SERVICES, USE AND CHECKIN OF FORECASTS (551.509.5)

12L–488 551.509.5:551.515.2(

Crooks, Ray (*U. S. W. B., San Francisco, Calif.*), **The SS Sonoma and Hurricane** *Mariners Weather Log,* Wash., D. C., 3(6):220–221, Nov. 1959. 2 figs. **DWB**—A note plimenting S.S. "Sonoma" for its excellent weather reporting which provided several days adv warning of the existence of "Hurricane Dot," Aug. 1–7, 1959. This was one of the most vi tropical cyclones to affect the Hawaiian Island in recent years. Graphical representation the preliminary track of Hurricane "Dot" and barogram trace of S.S. "Sonoma" are given. development of the storm and the corresponding weather reporting by S.S. "Sonoma" is descr *Subject Headings:* **1. Hurricane warning services 2. Hurricane "Dot" (1959) 3. Ha** —*I.S.*

12L–489 551.509.5:551.

*Hilder, Brett, **On the avoidance of hurricanes.** *Institute of Navigation, London, Jou* 11(2):194–206, April 1958. fig., table. **DLC**—This presidential address was given at the tralian Institute of Navigation at its annual meeting on Dec. 4, 1956. Describes the hi occurrences of hurricanes, dating back to the thirties. Individual hurricanes and damages are reported. Difficulties of forecasting are discussed. Meteorological warnings based 700 mile-radius or more is suggested as required by shipping. The president recommends a strict system of hurricane watches be carried out from the beginning to the dissipation o hurricane. *Subject Heading:* **1. Hurricane warning services.**—*N.N.*

12L–490 551.509.5:551.515.2(7

Lugo Santos, Amable (*Dominican Red Cross*), **The National Board of Refuge and sistance Against Hurricanes in the Dominican Republic.** (In: Caribbean Hurricane Se Ciudad Trujillo, Feb. 1956, **Final Report of the Seminar,** pub. 1956. p. 303–305) **DW** Civilian and military buildings and facilities are used as public refuge during hurricanes. of life has been considerably minimized because warning signals have been adequate. *S Headings:* **1. Hurricane warning services 2. Dominican Republic.**—*E.Z.S.*

12L–491 551.509.5:551.515.2

Pardue, L. G. (*U. S. W. B., Miami*), **Weather amateur reporting network.** *Weathe* Boston, 6(4):95, 94, Aug. 1953. fig. **DWB**—An amateur hurricane reporting networ

set up in 1950 by the Miamin Weather Bureau Hurricane Warning Center with the cooperation of the Dade Radio Club. By the summer of 1953, 47 stations were operating in Florida, including 38 amateur radio stations. Thirty stations had anemometers and wind vanes, and all stations had barometers. *Subject Headings:* **1. Hurricane warning services 2. Amateur weather stations 3. Florida.**—*M.R.*

12L–492 551.509.5:551.515.2(73)

Reichelderfer, F. (*Chief, U. S. W. B.*), **United States National Hurricane Research Project.** *Marine Observer,* London, 29(186):188–191,**1959.** 2 figs. **DLC**—After the hurricane catastrophes of 1954 and 1955, the U. S. Congress appropriated funds in the spring of 1955 for the intensive investigation of severe storms and hurricanes. This report describes the basic plan of study of the problem and the preliminary results of the research made on Hurricane "Carrie" 6–21 Sept. 1957, and on "Helene" and "Daisey" during 1958. A preliminary conclusion is that an understanding of the distribution of wind near a hurricane core leads to a fair prediction of the movement of such storms. Details on the forecast of hurricane movements and the techniques used for detecting and tracking it are discussed. *Subject Headings:* **1. Hurricane research projects 2. Hurricane forecasting 3. Hurricane warning services 4. United States.**—*N.N.*

12L–493 551.509.5:656.61(26)

Frankcom, C. E. N., **Editorial [on shipping losses due to weather].** *Marine Observer,* London, 23(161):118–120, July **1953.** 2 figs. **DWB**—Discussion of shipping losses due to weather and use of meteorological services to minimize them. Possibility of transmission of facsimile weather charts by radio to ships is considered. *Subject Headings:* **1. Shipping forecasting 2. Shipwrecks.**—*C.E.P.B.*

12L–494 551.509.5(794)

Behind the scenes at San Diego Office, U. S. Weather Bureau. *Union Title-Trust Topics,* San Diego, Calif., 6(6):10–12, Nov./Dec. **1952.** illus. **DWB**—A firm stand against doubts that considerable expense in manpower and equipment is justified "simply to produce the usual 'variable high cloudiness' forecast . . . in one of the nation's most even climates." Importance of the San Diego Office's activities in storm warning, aviation forecasting, frost prediction, industrial forecasting, etc., is stressed. A brief history of the Office is added. *Subject Headings:* **1. Weather services 2. San Diego, Calif.**—*G.T.*

12L–495 551.509.5:061.1(73)

Hughes, Lawrence A. (*U. S. W. B., Chicago*), **Report of activities (of the Chicago forecast center of the Weather Bureau).** *Conference on Great Lakes Research, 3rd, Ann Arbor, Mich., May 6–7, 1959, Proceedings,* pub. **1960.** p. 143–144. **DWB** (M82/779 C748pr)—A brief report outlining the activities of the personnel of the Chicago Forecast center of the Weather Bureau. Two problems were considered: (1) The effect of the Lakes on adjacent land areas in which the Lakes are taken as a unit and (2) Local effects of a single Lake or a portion of a Lake. The present observational network is reasonably satisfactory for working on the first, but not the second problem. FUJITA is using mesoanalysis techniques. This method uses time sequences from each station to obtain considerable interpolative information on space variations, and thus has the effect of extending data coverage. At best, however, this method is seen as an interim procedure pending a good observational program both of surface events and events aloft. *Subject Headings:* **1. Weather service conferences 2. Chicago Forecast Center 3. Chicago, Ill.**—*E.Z.S.*

12L–496 551.509.5:061.1(569.4)

Levi, M. L., **Forecast center at the Lydda Airport.** (In: Israel. Meteorological Service, **Book of ten years of Meteorological Service of Israel.** Tel Aviv, **1958.** p. 16–18. photos. In Hebrew.) **DWB** (M(06)185se)—Following introductory remarks concerning synoptic and climatological meteorology, the article describes the beginning of synoptic meteorology in Israel which is connected with the station at Lydda Airport. Beginning in World War II, the brief but turbulent history of the Meteorological Service is traced. In discussing the work of the forecast center, its functions are enumerated as: 1) receipt of weather data from abroad which includes the Mediterranean area, Europe, Africa and Asia; 2) observation and graphical representation of the climatological data and 3) the analysis of maps and forecasting of weather. In conclusion, several difficulties in forecasting are mentioned. The article includes photographs of various meteorological activities. *Subject Headings:* **1. Forecasting services 2. Lydda Airport, Israel.**—*I.S.*

12L–497 551.509.5:061.1(7

Lin, S. H., **A brief study of National Weather Analysis Center in U. S. A.** *Meteorolog Bulletin,* Taipei, Formosa, 1(4):33, Dec. **1955.** In Chinese. **DLC** (Orientalia)—This is a r describing the National Weather Analysis Center situated at Suitland, Md. The descript contains information on the areal capacity of the base, building, departmental organization, sta number of instruments and workability: the number of surface and upper air charts which used at a given time. Coordination and functional cooperation are the key factors in the Cen *Subject Headings:* **1. Weather services 2. National Weather Analysis Center 2. Suitla Md.**—*K.C.*

12L–498 551.509.5:551.578.468:79

§*Miyazaki, Kenzô, **Nadare-gaku josetsu.** [Avalanche.] *Seppyo* (*Snow and Ice*), To 14(3):73–105, Nov. **1952.** tables, numerous figs. In Japanese. **DWB**—A long technical ar on ice and snow physics and structure, reviewing a considerable body of literature from S and English sources, and presenting local synoptic studies for forecasting avalanche conditi especially for skiers. *Subject Headings:* **1. Avalanche warning services 2. Snow and structure 3. Skiing.**—*M.R.*

12L–499 551.509.5

Schwenzfeger, E. E., **A high-volume, high-speed weather information distribution sys** *Bell Telephone System Technical Publications, Monograph 3496,* **1959.** 7 p. 6 figs., table, 5 **DWB** (M09.5 S414hi)—In view of the necessity for rapid and efficient communication of obse tion and forecast data, the Air Navigation Development Board in conjunction with the asked the Bell Telephone Laboratories to make an engineering study and propose a system w would satisfy present day and future requirements. The proposed system is discussed in paper. This is a high-speed distribution system and is in effect based on the old telephone line concept, arranged for transmitting data and messages at the rate of 1,000 words per There may be as many as 1,000 stations which transmit data and perhaps as many as which receive them. *Subject Headings:* **1. Weather information distribution 2. Wea services 3. United States.**—*I.S.*

Airways Forecasting

12L–500 551.509.5:6

Allen, H. A., **A pilot's observations on the forecast.** *Weather, London,* 7(5):142 May **1952. DWB**—Remarks on need for precision in forecasting conditions marginal for fl *Subject Heading:* **1. Airways forecasting.**—*C.E.P.B.*

12L–501 551.509.5:6

Corby, G. A., **The viewpoint of the aviation forecaster.** *Weather,* 7(8):246–248, **1952. DWB**—Reply to criticisms by Allen (*see* 12L–500, this Bibliog.). *Subject Hea* **1. Airways forecasting.**—*C.E.P.B.*

12L–502 551.509.5:6

Elford, C. Robert (*U. S. Weather Bur.*), **FAWS: Flight Advisory Weather Service.** *Sea Safety,* Washington, D. C., 2(3):30–37, March **1947.** photos. **DWB**—The Weather Bu service known as FAWS acts as a clearing house for observation received from many s (including Analysis Center and Airway Forecast Centers) and as a source of professional for the individual pilot. There are 18 such units in the country generally in close contac the Airway Traffic Control Centers of the C.A.A. *Subject Headings:* **1. Airways forec 2. U. S. Weather Bureau 3. United States.**—*M.P.K.*

12L–503 551.509.5

Griffith, Rolla C. (*U. S. A. F., 134th Fighter Bomber Wing*), **Weather briefing of jet pilots.** *U. S. Air Force. 2143D Air Weather Wing, Technical Bulletin* No. 8:13–17, Jan **DWB**—The briefing of jet pilots is in general the same as for pilots of conventional plan certain factors must be predicted much more accurately. Among these are winds at 10, and 40 thousand feet, and these must be accurate enough to prevent a plant from carryin 100 gal too much fuel, for that would mean 35 min flying time at 45,000 feet, or 5 min time at 1000 ft. Other factors are pressure, altitude, runway temperatures (difference b 40°F and 95°F means difference of 2200 pounds load), contrail level, tropopause, turbulen streams, freezing level, icing, altimeter setting, alternates and pictorial cross sections. *Headings:* **1. Weather briefing 2. Jet transport operation 3. Airways forecasting.**—*M*

12L–504 551.509.5:629.13

Olshevsky, Dimitry E., **Optimum sequencing of weather forecasts.** Cornell Aeronautical Laboratory, Inc., Contract Cca-28482 (Regularization of air traffic), Report No. JA-693-P-4, Pt. 4, June 15, 1951. 13 p. diagr., chart (fold.), refs., eqs. **DWB**—An attempt is made to work out by statistical methods a rational or rationalized time interval between forecasts, which will avoid unnecessary cost (as would be the case with very frequent forecasts) or operational inefficiency or failure (if forecasts are too infrequent). Determination of the forecast prior to take-off, and during flight is considered. An example is given showing 5.43 hours, rather than 3 hours as at present, to be the optimum spacing. *Subject Headings:* **1. Airways forecasting I. Cornell Aeronautical Laboratory, Inc.**—*M.R.*

12L–505 551.509.5:656.7

Olshevsky, Dimitry E., **Suggestions for the improvement of forecasting for air traffic control.** Cornell Aeronautical Laboratory, Inc., Contract Cca-28482 (Regularization of air traffic), Report No. JA-693-P-5, pt. 5, June 15, 1951. 9 p., diagr., charts, ref. **DWB**—A list of parameters the author thinks should be forecast for air traffic coordination, suggested methods of presenting data, frontal positions and movements, etc., organization and equipment of observing and forecasting stations, coarse vs fine-mesh forecasting systems and new equipment such as automatic airplane weather reporting stations on airliners are discussed and illustrated. *Subject Headings:* **1. Airways forecasting 2. Air traffic control 3. Automatic air-borne stations. I. Cornell Aeronautical Laboratory, Inc.**—*M.R.*

12L–506 551.509.5:629.13

Operational weather problems: Flight operations round table. *Skyways*, N. Y., 12(12): 18–20, 39–42, Dec. 1953. photos. **DWB**—This round table discussion of which Carl M. Christenson of United Air Lines was moderator and Robert H. Simpson of the U. S. Weather Bureau was speaking for the Weather Bureau's airways and forecasting service, embraced many phases of airway weather reporting and forecasting as affecting scheduled and noncommercial flying. Major problems are unexpected thunderstorms, visibility at terminals, flexible take-off and landing specifications, variable conditions on different parts of the runway, radar warning networks such as those being installed in Texas for experimental thunderstorm and tornado location, pilots' report dissemination, etc. *Subject Headings:* **1. Airways weather reporting 2. Airways forecasting 3. Thunderstorm location 4. Aeronautical meteorology. I. Simpson, Robert H.**—*M.R.*

Evaluation and Verification (551.509.5)

12L–507 551.509.5:551.509.33

Bagrov, N. A., **O gidrodinamicheskikh metodakh dolgosrochnykh prognozov pogody.** [Hydrodynamic methods of long-range weather forecasting.] *Meteorologiia i Gidrologiia*, Leningrad, No. 11:41–46, 1958. 2 tables, 6 refs., 5 eqs. **DWB, DLC**—The author examines the success of the 30 and 40 day forecasts prepared during the period 1952–1957 by the method of E. N. Blinova (outlined briefly) in the section of dynamic meteorology in the Central Institute of Forecasting. The forecasts were evaluated by three methods which are outlined in detail. One is based upon the agreement of the signs of the forecast and actual anomalies; the evaluation formula is $\rho = \frac{n_+ - n_-}{N}$, where n_+ = number of points where forecast was verified, n_- = number of points where forecast was not verified and N = total number of points. The value of ρ ranges from $+1$ to -1. Another method is that expressed by

$$Q = \frac{1}{N} \Sigma \frac{(A_\phi - A_n)^2}{\sigma^2}$$

where the numeration is the difference between actual and forecast anomalies and σ^2 = scatter of actual anomalies; $Q < 1$ indicates a good forecast system and when $1 < Q < 2$ cannot serve as an index of forecast quality. For 1957, $\rho = +0.12$ and $Q = 1.33$. An evaluation of the forecasts by means of association tables (Bagrov *Met. i. Gid*, No. 6, 1953) gave a value of 0.5% greater than chance for 1957. The relationship between the temperature anomalies of three days, regarded as initial days with actual and forecast anomalies indicates that the relationship between the mean anomalies of the first 3 days and the actual is positive in 61% of the cases, while that between forecast and actual is positive in 51% of the cases. The author also discusses the long range forecasting of the circulation index and synoptic, empirical and dynamic forecasting. *Subject Headings:* **1. Long range forecasting 2. Forecast evaluation.**—*I.L.D.*

12L–508 551.509.5:551.509.

*§Baĭdal, M. Kh., **Osnovy kompleksnogo makrotsirkuliatsionnogo metoda dolgosrochny prognozov pogody.** [Principles of the complex macrocirculation method of long range weath forecasting.] *Alma-Ata, Kazakhstan. Kazakhskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologic skiĭ Institut, Trudy,* No. 10:37–72, **1959.** 6 figs., 11 tables, 19 refs., 4 eqs. **DWB**—A comp hensive review of Russian literature about this subject gives a background to the study. P longed study, collection and calculation of data make it possible to state that the predominant str tural feature of our atmospheric circulation is the $\pi B\phi 3$—Planetary High Frontal Zone. the basis of previous knowledge of its properties, growth, and development long range-mont and seasonal prognoses of its transformations can be made and hence weather conditions may predicted. Successful predictions are illustrated. Frequency charts, records of movemen anomaly tables, temp. and rainfall records are included. *Subject Headings:* **1. Long range fo casting 2. Forecast evaluation 3. Planetary High Frontal Zone 4. Alma-Ata, Kaza S.S.R.**—*E.Z.S.*

12L–509 551.509.5:551.509.

Borisova, L. G., **Klimatichekaia sviaz sinopticheskikh protessov.** [Climatic relationsh of synoptic processes.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 71:27–40, 19 4 figs., 3 tables, 8 refs. **DLC**—The problem of forecasting the successive development of synop processes and weather during a calendar month is examined. The sequential development synoptic processes within one calendar month is regarded as a unique phasing of synoptic pr esses in the continuous chain of their development and the frequency of phasing in all ot months is investigated. The synoptic processes of the month investigated were compared w processes of the six preceding months and the degree of their analogousness was determi Analogousness of processes was followed within time intervals for 45 days to the month of parture. The verification was made with synoptic kinematic maps and mean AT_{500} maps of natu synoptic periods. The valuation of analogousness of the synoptic processes was carried out l visually and by computing correlation coefficients between the directions of frontal zones al The results of the study are presented in tables showing the probability (%) of the climatol relationships of synoptic processes of individual months over different time intervals (days) the period 1944–1955, rank correlation coefficients between directions of frontal zones aloft different time intervals (days), coincidence of the sign of the pressure fields during analogous of synoptic processes of individual months, number of analogous synoptic periods in the cli tologic association of synoptic processes for various months, frequency of analogous sync processes according to pentads in the climatologic association of various months etc. *Sub Headings:* **1. Long range forecasting 2. Analog forecasting methods 3. Forecast evaluat** —*I.L.D.*

12L–510 551.509.5:551.50

Boville, B. W., **A report on the verification of prognostic charts issued by the cen analysis office.** *Canada. Meteorological Div.,* CIR-2837, TEC-239, Nov. 1, **1956.** 5 p. 4 f ref. **DLC**—The prognostic charts (30 hr surface, 36 hr 500 mb) are verified on a routine b For this purpose two methods are used, objective and subjective. Eleven months of verifica data have been accumulated for the surface prognostic charts. The objective and the subje scores are discussed and graphically represented. The central analysis office scored progn charts well over the period of the survey. The gradient scoring method is found to provi satisfactory test of accuracy for this type of forecast and the drawback is due to the long which is required to carry out the procedure. *Subject Headings:* **1. Prognostic chart verifica 2. Forecast evaluation.**—*I.S.*

12L–511 551.509.5:551.509

Iudin, M. I., **Sinopticheskiĭ material dlia ispytaniia chislennykh metodov progn** [Synoptic data for testing numerical forecast methods.] *Meteorologiia i Gidrologiia, Mos* No. 7:22–25, July **1960.** table. **DWB, DLC** (QC851.M27)—This paper sets out the re mendations of the synoptic meteorology section of a working group set up to determine a stan method for the checking of numerical forecast methods. In order to make the checking as o tive as possible a series of dates have been chosen so as to include as wide a range of syn situations as possible. It is proposed that all trials be carried out at least during 16 of periods. It was not thought necessary to regularize methods of estimating the correctness o forecasts as these could be varied to show the strengths and weaknesses of the method u trial. However, some generalizations of the various methods used are made. *Subject Head* **1. Forecast evaluation 2. Numerical forecasting 3. U.S.S.R.**—*R.B.*

12L–512 551.509.5:551.579

Mashukov, Peter Mikhailovich, **Ob otsenke gidrologicheskikh prognozov.** [Evaluation of hydrologic forecasts.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy,* No. 94:71–78, **1959.** 10 eqs. **DWB**—The computation of verification of forecasts expressed by the correlation coefficient is analyzed. The equations for the correlation coefficient and mean square deviation and regression equation are given and the use of the correlation coefficient as a criterion of the verification of the association of predicted and observed values is discussed. The author proposes a more feasible method of forecast evaluation also proceeding from the general conception that verification is a measure of the closeness of the relationship between predicted and observed values of a given magnitude. This procedure is based upon the principle that the verification of the closeness of forecasts is the ratio of number of verified to total number of forecasts. The derivation of equation for the closeness of forecasts, Ω, and Δ the permissible error are presented; these are

$$\Omega = 100\frac{N_1}{N} = 100\frac{2}{\sqrt{2\pi}}\int_0^{0.674\sigma_y/\sigma_t} e^{-u^2/2}du$$

and $\Delta = 0.674\sigma_y$ where $\sigma_y = \sqrt{\frac{(y - y_0)}{N}}$ and $\sigma_t = \sqrt{\frac{+2}{N}}$. The use of these equations and the procedure for calculation are discussed. *Subject Heading:* **1. Hydrologic forecast evaluation.**—*I.L.D.*

12L–513 551.509.5

Narita, K., **Weather forecasting and its entropy.** *Journal of Meteorological Research,* Tokyo, 11(9):795–804, **1959.** figs., 6 tables, 4 refs., eqs. In Japanese. **DWB, DLC**—Weather in each season has a unique and statistical probability for the judgment of forecasting. This report is based on presumed data made by 21 students without any actual data to reach a correct judgment. The method is as follows: optional decision is made as to whether it is to be cloudy or clear on a given date of the year, then, according to the designation, in consideration of variation and periodicity through meteorological experience, a further forecast can be attempted in a unit of 3-day or 5-day range. The result of predicted rate was compared with that of observed rate, as shown in tables. *Subject Heading:* **1. Forecast evaluation.**—*K.C.*

12L–514 551.509.5

Nemoto, J., **The economic value of weather forecast.** *Journal of Meteorological Research,* Tokyo, 10(10):823–825, Oct. **1958.** 5 tables, 3 refs., 8 eqs. In Japanese; English summary p. 823. **DWB, DLC**—The evaluation of weather forecast is studied for the simplest cases where the skill may be divided into the two categories of success and failure. Three conditions that should be fulfilled for the forecast to be valuable economically are proposed. It is shown that the economic value of the forecast does not always depend upon the skill of the forecast. *Subject Headings:* **1. Forecast evaluation 2. Japan.**—*Author's summary.*

12L–515 551.509.5:551.579(282.247)

Parshin, V. N. and Salov, M. S., **K probleme prognoza godovogo stoka krupnykh rek.** [Problem of forecasting annual runoff in large rivers.] *Meteorologiia i Gidrologiia,* Leningrad, No. 4:9–14, April **1957.** 2 figs., 3 tables, ref. **DWB, DLC**—An attempt is made to forecast annual runoff of the rivers of various regions without forecasting weather. Such forecasts of annual runoff are most effective for rivers where runoff is determined to a considerable extent by meteorological conditions which are cumulative at the end of the calendar year. Such rivers are for example, those of the zone of deficient moisture, such as the Don Basin. The dependence of spring flood runoff and autumn runoff upon annual runoff and the possibility of forecasting annual runoff from the volume of spring runoff calculated from hydrometeorological conditions at the end of the calendar year are discussed. By calculating the maximum snow reserves(since there is no reliable method for forecasting precipitiation) and using the method for forecasting spring runoff from total water supply in a catchment basin the authors made verified forecasts, on the basis of data on Dec. 31 for the Don River for the period 1935–1951. The errors of the verified forecasts of annual runoff did not exceed 20% of the actual runoff in 80% of the cases. Also seasonal runoff can be forecast for the Don River. Data on the spring flood and fall runoff on a function of annual runoff and on the errors of the verified forecasts of annual runoff and on seasonal runoff for the Don River, graphs showing the calculated and actual runoff, etc. are presented. *Subject Headings:* **1. Annual runoff forecasting 2. Forecast evaluation 3. Don River, U.S.S.R.**—*I.L.D.*

12L–516 551.509.5:551.579

Popov, E. G. and Parshin, V. N., **Otsenka metodiki i opravdyvaemosti gidrologicheskikh prognozov.** [Evaluation of methods of verification of hydrologic forecasts.] *Moscow. Tsen-*

tral'nyĭ Institut Prognozov, Trudy, No. 84:3–42, **1959.** 13 figs., 6 tables, 13 refs., 50 eqs. **DW**
—This comprehensive examination of the statistical evaluation of the methods of hydrologi
forecasting and of the verification of the forecasts comprises the following, viz: fundamental
quirements for evaluating forecast; defects in present systems of evaluation—constancy of
permissible error; uniform relative accuracy of verified forecasts etc; statistical basis of
method of evaluation and verification of forecasts—including the mean square deviation the pr
able error, the normal curve, the coefficient of asymmetry, the correlation coefficient etc; determi
tion of the mean square deviation for given permissible errors; characteristics of the evaluation
forecasts based upon the relationship of previous and subsequent water content of rivers; eva
ation of long-range forecasts of time of arrival of characteristic phenomena of the hydrolog
regime such as time of appearance of ice, freezing and thawing of rivers, time of arrival of fl
peaks, etc.; evaluation of short-range forecasts of ice phenomena such as freezing and thaw
of rivers; characteristics of the evaluation of the forecast methods based upon the relationship
calendar dates of the arrival of characteristic phenomena; and forms of release of hydrolog
forecasts. The relevant equations and graphs are presented. *Subject Headings:* **1. Hydrolog
forecasting 2. Forecast evaluation.**—*I.L.D.*

12L–517 551.509.5:551.50

Sadokov, V. P., **O printsipial'nykh oshibkakh v teoreticheskikh osnovakh metoda
gosrochnykh prognozov pogody maloĭ zablagovremennosti.** [Errors of principle in the th
retical bases of the method of long-range weather forecasting a short period in advan
Akademiia Nauk SSSR, Izvestiia, Ser. Geofizich., No. 8:1282–1284, Aug. **1960.** 5 refs.,
Reply by Iu. B. Khrabrov, p. 1285–1286. Transl. into English in the corresponding numbe
its *Bulletin of the Academy of Sciences USSR, Geophysics Series.* **DLC**—Specific comments
several works of Iu. B. Khrabrov are made. Some characteristics of general atmospheric
culation and deductions of dynamic meteorology are the basis of this method. The analysis
the forecasting method used in a few practical cases is included. The conclusion is that
theorem on the preservation of absolute velocity of the gust is erroneously applied to the com
of technical methods which could not be subjected to any physical interpretation. Khrabr
method therefore, could not be used for 3–7 day forecasting. Khrabrov's reply contains var
explanations supporting his method and explaining his theory for practical purposes. *Sub
Headings:* **1. Long range forecasting 2. Forecast evaluation 3. Khrabrov, Iu. B.**—*N.*

12L–518 551.509.5:5

Sasaki, Y. (*Texas A. & M. College*), **An objective analysis based on the variati
method.** *Meteorological Society of Japan, Tokyo, Journal,* 36(3):77–88, June **1958.** figs., 2 n
77 eqs. **DWB, DLC**—Using techniques of the calculus of variations, two cases are stu
Case I is based on the assumption of quasi-geostrophic and thermal wind conditions and cas
is based on conditions defined by non-divergence and the "balance equation" which correspon
an equivalent barotropic flow. The method is demonstrated by three simple examples. *Su
Headings:* **1. Objective forecasting methods 2. Forecast evaluation.**—*Author's abstract.*

12L–519 551.509.5:551.579:551.5

*Shpak, I. S., **O tochnosti nabliudeniĭ nad snezhnym pri snegos'emkakh.** [Accurac
snow cover observations during snow surveys.] *Leningrad. Gosudarstvennyĭ Gidrologich
Institut, Trudy,* 45(99):233–284, **1954.** 25 tables, 11 figs., 13 refs. **DLC** (GB651.L38)—
author discusses the problem of accuracy of snow measuring surveys which is of great import
for the computation and forecasting of spring runoff. On the basis of a statistical processin
voluminous data of snow measuring surveys of Valday, Nizhnedevitsk and Bol'she-Sareev r
stations, concrete recommendations for improving the methods of snow measuring surveys,
for improving their accuracy are introduced by the author. *Subject Headings:* **1. Snow m
urement accuracy 2. Runoff forecasting 3. Hydrologic forecast evaluation 4. U.S.S.**
A.M.P.

12L–520 551.509.5:061.3(47):551.57

Zverev, N. I., **Itogovaia sessiia Uchenogo soveta Tsentral'nogo instuta prognozov.** [
mary Session of the Scientific Council of the Central Forecasting Institute.] *Meteorolo
Gidrologiia,* Leningrad, No. 5:61–62, May **1959. DWB, DLC**—During June 12–20, 195
Council devoted its session to the work carried out during 1958. L. A. Razunov and
Mastinskaia reported on the results of three years of experimental work on the formati
soil moisture reserves in connection with summer wheat and maize and with conditions of
supply on virgin soils in the steppe regions of Kulanda and norther Kazakhstan. B. P. I
mariia discussed the agrometeorological conditions of the growth of summer wheat in

R.S.F.S.R. V. N. Parshin and E. G. Popov developed a new method of evaluating hydrologic forecasts. N. P. Luzhnaia reported on the results of experiences with 24 hr temperature forecasts developed by O. P. Glazov and wind forecasts at great heights proposed by A. D. Chistiakov. N. G. Leonov reported on the characteristics of Antarctic circulation. Iu. B. Khrabrov reported on a new method of 3–7 day weather forecasts. N. I. Zverev presented a paper on 24, 46 and 74 hour precipitation forecasts for central European U.S.S.R. by means of multiple regression, etc. *Subject Heading:* **1. Forecast evaluation conferences.**—*I.L.D.*

12L–521 551.509.5:551.509.312

Tänczer, Tibor, **A számszerű előrejelzések kiértékeléséről.** [Verification of numerical forecasts.] *Időjárás, Budapest,* 64(1):49–52, Jan./Feb. **1960.** 3 figs., table, ref. **DLC**—In comparing various methods of numerical forecastings the criterion of success of forecasts may be determined by the difference between the percent outcome of forecasts and the remaining factor. More caution is necessary to compare the values relating to different levels and, due to the deliberately selected error limits, only qualitative comparison is admissible. The serviceableness of the method and its usefulness for characterizing the degree of the criterion of success is proved by the outlined viewpoints. The regional distribution of the percent success of forecasts, of the remaining tendency and of the relative accomplishment are illustrated by weather charts. *Subject Headings:* **1. Numerical forecast verification 2. Forecast evaluation.**—*O.T.*

12L–522 551.509.5:551.509.33:551.513.1

Vitel's, L. A., **Proverka metodiki prognoza sezonnykh kharakteristiki tsirkulatsii.** [Verification of a method for forecasting seasonal characteristics of circulation.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 89:60–65, **1959.** table, ref. **DWB**—The method of long range forecasting of seasonal characteristics of pressure calculation and its application are discussed. This formula is $n_A{}^T = 2.25\,B_A + 30$ ($n_A{}^T$ = number of days with anticyclonic or cyclonic circulation for the southern half of European U.S.S.R., B_A = forecasting number obtained by comparing a series of prognostic signs with anomalies of the pressure circulation regime of preceding months from April of the current to June of the preceding year). The results of verification of the forecasting relationships obtained on the basis of 18 normal forecasts for the summer seasons (June–Aug.) 1948–1957 are presented. They show the same order of verification as that obtained for the period 1901–1939. The validity of the method for forecasting seasonal circulation properties a month before the start of a given season is demonstrated. *Subject Headings:* **1. Forecast evaluation 2. Seasonal circulation forecasts 3. Forecast utilization.**—*Author's abstract and I.L.D.*

12L–523 551.509.5:551.509.34

Wan, P. K., **Basic principles and their applications to objective weather forecasting.** *Meteorological Bulletin,* Taipei, Formosa, 1(3):5–24, Sept. **1955.** 14 figs., 9 tables, 15 refs. 23 eqs. In Chinese. **DLC** (Orientalia)—Basic principles of an objective aid to local forecasting are described, emphasizing factors such as numerical calculation, statistical operations, selection of analogues, and study of case histories. This method can be utilized for estimating fog and stratus probability and is being tried in Texas and Colorado. All figures and tabulations were based on data gathered in the United States. *Subject Headings:* **1. Objective forecasting 2. Forecast evaluation.**—*K.C.*

12L–524 551.509.5:551.509.313

Wan, P. K., **Verification of weather forecasting.** *Meteorological Bulletin,* Taipei, Formosa, 2(2):8–12, 41, June **1956.** 6 figs., 7 refs., 2 tables. In Chinese. **DLC** (Orientalia)—The objectives of short range forecasting of upper air and surface weather are explained. The author explains how prognostic charts are drawn and evaluated. For comparative purposes the forecast verification methods used by M.I.T. and Calif. Inst. of Tech. are explained. *Subject Headings:* **1. Forecast verification 2. Prognostic charts 3. Numerical forecasting.**—*K.C.*

12L–525 551.509.51:551.524.3

Fujii, T., **Relations of air temperature to weather.** *Journal of Meteorological Research,* Tokyo, 10(4):353–357, April **1958.** 10 figs. In Japanese. **DWB**—By comparative study of cold temperature of the surface air, the author offered an explanation of continuous bad weather in Tokyo, Sapporo and Hiroshima since 1953, and particular attention was given to the observation of the deflected deficit curve of five days air temperature and the curve rate of sunshine. A slight difference of intensity in these areas was found, but not for the duration of change. By the same method, the independent area of Tokyo in 1950–1956 was shown to have periods of summer and winter and of parallel and unparallel weather. The parallel period consisted of a clear and

straight line contrary to the unparalleled, because of the high rate of sunshine. Accordingly t continuous bad weather is shorter in winter, and the rate of sunshine is also short in the seas of Baiu and Autumn rain. A slight difference in remaining parts of the two areas is shown means of 10 figs. *Subject Headings:* **1. Surface air temperatures 2. Weather analysis.**—*K.*

12L–526 551.509.51:551.51

Vítek, Vojtéch, **Vztah mezi horizontální divergencí a vertikální rychlostí.** [Relation tween horizontal divergence and vertical velocities.] *Meteorologické Zprávy,* 10(5):131–1 **1957.** 6 eqs., Russian and English summaries, p. 131. **DWB**—Starting from equations of ho zontal frictionless flow, an expression showing the theoretical relation between horizontal diverge and vertical velocity is derived. It appears that the production of horizontal divergence is direc proportional with the production of vertical velocity, the two phenomena having opposite sig *Subject Heading:* **1. Horizontal divergence—vertical velocity relationships.**—*G.T.*

Strong Winds (551.509.52)

12L–527 551.509.52:551.515

Gentry, Robert Cecil (*U. S. W. B.*), **A re-evaluation of the problem predicting hurric movement.** (In: Technical Conference on Hurricanes, Miami Beach, Fla., Nov. 19–22, 19 **Proceedings,** issued **1958**(?) Section H1 (8 p.) 3 figs., 10 refs.) **DWB** (M15.2 A512pr Along with the review of forecasting literature, the so-called "basic current" movement is examined as part of the current knowledge of factors influencing movement. The activities some results of the N.H.R.P. particularly in the last year, are considered; also the accuracy the U. S. Weather Bureau forecasts during 1955–57 and by others in 1958 is given attent A classification of accuracy of forecasts is given. *Subject Headings:* **1. Hurricane movem forecasting 2. Forecast evaluation.**—*W.N.*

12L–528 551.509

Good, G. D. (*Norfolk, Va.*), **Subjective forecasting rules. 1956?** 5 p. Mimeog. **D** (M09.52 G646x)—Numerous practical rules for forecasting path recurvature, speed, inten and other features of a hurricane approaching the East Coast of the U. S. are set forth. *Sub Headings:* **1. Hurricane forecasting rules 2. East Coast of United States.**—*M.R.*

12L–529 551.509.52:551.553.8(5

Lal, S. S. and Rai Sircar, N. C. (*both, Met. Office, Poona*), **A monsoon storm as stu on 5-day mean charts.** *Indian Journal of Meteorology and Geophysics,* New Delhi, 11(3):2 275, July **1960.** 8 figs., 3 refs. **DWB, DLC**—The storm developed at the head of the Bay Bengal and moved across India. Two more disturbances coincided—one in the Pacific Ocean the other in the South China Sea. The three disturbances developed in sea areas within a lati belt of 10°. The Pacific Ocean disturbance eventually intensified into a typhoon. The 5 mean charts and 700-mb charts, discussed in this paper, were prepared for the period 17–21, 20 22–26 and 24–28 Aug. The mean pressure and contour data for areas outside the Indian continent were obtained from the mean northern hemisphere charts prepared by the U. S. Wea Bureau. *Subject Headings:* **1. Monsoon storms 2. 5-day mean charts 3. India.**—*I.S.*

12L–530 551.509.52:551.553.8(26

Litvinova, L. E., **Prognoz shtormovogo (sil'nogo) vetra na Aral'skom more.** [Forecas storm (strong) winds over the Aral Sea.] *Sredneaziatskiĭ Nauchno-Issledovatel'skiĭ Gidrome logicheskiĭ Institut, Trudy,* No. 1(16):105–110, **1959.** 5 figs., 7 eqs. **DWB** (M(055)U581ts)– the basis of V. I. Gubin's study on the intensification of wind at the surface of the earth as a func of variation in pressure gradient (*Instituta Matematiki i Mekaniki im V. I. Pomanovskogo, Tr* No. 14, **1955,** Tashkent), the author determined quantitative criteria for forecasting storm wind the Aral Sea. The basic theoretical presupposition of V. I. Gubin's work is reviewed and derivation of the equation expressing the relationship between increase in pressure gradient increase in wind velocity is outlined; namely:

$$v_2 - v_1 = 1/l\rho\,|\nabla\dot{p}|\cos\psi Dt \qquad \text{or} \qquad v_2 - v_1 = 2.6\,|\nabla\dot{p}|\cos\psi Dt$$

where $\dot{p} = \partial p/\partial t$, $\nabla = (\partial/\partial x)\vec{i} + \partial/\partial y$; ψ = angle between the pressure gradient and the isallo field; Dt = time for which the forecast is made. In solving the problem of intensification of at the surface of the earth as a function of variation of pressure gradient, it is necessary to solve problems, viz: to verify qualitatively the fulfillment of the condition $\nabla p \nabla \dot{p} \geqslant 0$ ($\nabla p = P_n$) the gradient will increase wherever the angle between the pressure and the isallobaric gradien acute and the computation of the increase in wind velocity by means $|\nabla\dot{p}|_2 - |\nabla\dot{p}|_1 = |\nabla\dot{p}|$ co and to compare the computed increase with the actual one. The application of V.I. Gubin's th

in practice is illustrated with the aid of actual examples. *Subject Headings:* **1. Strong wind forecasting 2. Aral Sea, Asiatic U.S.S.R.**—*I.L.D.*

12L–531 551.509.52:551.553.8

Miyazawa, S., **On the forecasting of maximum wind speed at Niigata in winter.** *Journal of Meteorological Research,* Tokyo, 11(8):674–680, Aug. 1959. 9 figs., 2 tables, 5 refs. In Japanese; English summary p. 674. **DWB, DLC**—The author investigated objective methods of forecasting of maximum wind speed at Niigata in winter and obtained several scatter diagrams applicable to forecasting. Some of the predictors were used as follows: 1) types of pressure distribution; the pressure distribution, in case of the strong wind at Niigata in winter, is classified into four types; 2) minimum sea level pressure; a linear relation exists between minimum sea level pressure and maximum wind speed at Niigata for each type of pressure distribution; 3) pressure tendency; the mean local change of surface pressure in falling, obtained from the barograms at Niigata; 4) wind speed at 1.5 km level; this is obtained from the upper-air sounding at Wajima at about the time when minimum sea level pressure is observed at Niigata and 5) Showalter's stability index; this is calculated from the same data as in (4). Using these predictors, maximum wind speed is expected to occur within the confidence limits of occurrence probability indicated in Table 2. *Subject Headings:* **1. Maximum wind forecasting 2. Wind speed maximum 3. Niigata, Japan.**—*Author's abstract.*

12L–532 551.509.52:551.553.8

Neuregelung der Wetterberichte und Sturmwarungen über Norddeich-Radio und Kiel-Radio. [Re-scheduling of weather reports and storm warnings over radio stations Norddeich and Kiel.] *Wetterlotse,* Hamburg, No. 135:207–208, Sept. 1958. fig. **DWB**—As of Oct. 1, 1958 the deep fishery in the previously designated "Northern North Sea, western part" will simply be "7" and such coding goes for some of the lengthy meteorological terms as well. Another improvement is that the 12-hr forecasts are extended to "outlook for the next 12 hrs." It is desirable to obtain forecasts for the Spitsbergen and West Greenland areas as well. *Subject Headings:* **1. Radio weather reports 2. Storm warning services 3. Europe.**—*W.N.*

12L–533 551.509.52:551.555.9(584.8)

Sultanbaev, M., **O prognoze sil'nykh vetrov ulan na ozere Issyk-Kul'.** [Strong wind ("ulan") forecasting on Issyk Kul' Lake.] *Srednеaziatskiĭ Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 1 (16):111–114, 1959. **DWB** (M(055) U581ts)—The "ulan wind" which is characteristic of the western half of the Issyk Kul depression often attains velocities exceeding 30 m/sec and may blow several days. It is of local origin and in most instances it originates in association with the incursion of cold air masses from the Chui Valley into the depression of the lake through the Booma gorge. An analysis of more than a hundred instances of "ulan" and of simultaneously obtained data on pressure and temperature at Tokmak (Chui Valley) and at the Rybach'ye (lake-depression) weather stations showed that in each instance the "ulan" was produced in the presence of definite pressure differences between the two points, i.e., the "ulan" arose when the actual pressure difference between these points increased and overlapped the critical difference and at the same time a horizontal pressure gradient appeared between these two points at the level of the pan. The actual difference is determined by the empirical formula $\Delta P = 91.7 - [(92 + P_2 - P_1)k + q]$ where ΔP = critical pressure difference, 91.7 and 92 constants, P_1 = actual pressure at Tokmak, P_2 = actual pressure at Rybach'ye, k = coefficient depending upon air temperature and q = temperature correction. The rules for forecasting the occurrence of ulans by using pressure differences are as follows, viz: (1) if the actual pressure difference arises during insignificant pressure changes in Tokmak then from the moment the actual pressure difference exceeds the critical one an intensification of the westerly wind up to 10–12 m/sec is to be expected in Tokmak, and (2) if the actual pressure difference arising during an intense rise in pressure (barometric tendency greater than 2 mb) at Tokmak approachs the critical difference by less than 3 mb then an intensification of the westerly wind by more than 12 m/sec is to be expected within the next 2–5 hours at west of the Issyk Kul depression. *Subject Headings:* **1. Strong wind forecasting 2. Issyk Kul, Kirgiz S.S.R.**—*I.L.D.*

Temperature (551.509.53)

See also: **Surface temperature forecasts** (Klein, Lewis) 12L–235; **Weekly temperature forecasts** (Sapporo District) 12L–453.

12L–534 551.509.53

*Arakawa, Hidetashi, **Winter severity as a warm or cool summer indicator in Japan.** *Meteorological Society of Japan, Journal,* Ser. 2, 32(7/8):240–242, July/Aug. 1954. 5 tables,

3 refs. In Japanese. **DWB**—Statistical data included. *Subject Headings:* **Severe winte 2. Cool summer forecasting 3. Japan.**—*M.R.*

12L–535 551.509

Maine, R. (*Bureau of Met., Adelaide*), **A critical appreciation of an objective techniq for maximum temperature prediction.** *Australian Meteorological Magazine,* Melbourne, N 25 : 73–75, June **1959.** 2 refs. **DWB**—A discussion of some of the short-comings of the autho (1958) forecasting technique and suggestions for eliminating them. *Subject Headings:* **1. Fo casting techniques 2. Maximum temperature forecasting.**—*E.Z.S.*

12L–536 551.509.53 :551.509.318 :551.524

*Nikitina, E. A., **Analiz i prognoz anomaliĭ temperatury vozdukha vesenikh mesiats** [Analysis and forecasting of atmospheric temperature anomalies of spring months.] *Mosco Tsentral'nyĭ Institut Prognozov, Trudy,* No. 71 :78–113, **1958.** 14 figs., 11 tables, 7 refs. **D** —The author investigates the character of the atmospheres macroprocesses of warm and c spring months and of preceding winter months and also the determination of some indication making forecasts of considerable atmospheric temp. anomalies in March, April and May. T material for this study consisted of synoptic maps for the period 1891–1958, maps of press topography from 1938 to 1950 and mean monthly maps of temp. distribution and its deviat from the normal and passages of air temp. through 0° and 5°C from 1891 to 1951 etc. Th data were classified into 7 regions embracing the central and northern parts of European U.S.S southern regions of Western Siberia and Northern Kazakhstan. In the spring the number warm and extreme cold months is similar since the number of months with extreme mont anomalies of atmospheric temp. in the above areas is greater than in the western regions of U.S.S.R. In the extreme months there are observed mean monthly values of H_{500} in which circulation over a considerable area is opposite to the long period normal for the given mo In most cases the centers of mean monthly H_{500} and temp. anomaly at the surface of the ea coincide in geographic position. The considerable anomalies of atmosphere temp. at the surf of the earth during the spring months over European U.S.S.R., northern Kazakhstan and west Siberia are divided into 7 groups depending upon the size and geographic position of the cent The characteristics of these groups their monthly frequence and the synoptic types producing t are described with the aid of numerical data and synoptic maps. Definite and rather sim relationships have been established between the macrosynoptic processes of the winter and immediately following spring season. These are as follows: if typical macroprocesses occu most of the winter months then the macroprocesses will be also in the spring months; and if winter processes are challenged by non-typical processes then the macroprocesses frequently be non-typical in the spring months. The criteria of analogousness and reverse relationship macroprosesses, are discussed. Examples of forecasting and the verification of forecasts presented. *Subject Headings:* **1. Temperature forecasting 2. European U.S.S.R. 3. West Siberia, U.S.S.R. 4. Kazakh S.S.R.**—*I.L.D.*

12L–537 551.509.53 :551.52

Rákóczi, Ferenc, **Kísérlet az éjszakai lenülés előrejelzésére H. Reuter módszerevel.** [Exp mental forecasts of night cooling with H. Reuter's method.] *Időjárás,* Budapest, 63(3) :165– May/June, **1959.** table, 6 refs., 6 eqs. **DLC**—The method is based on data obtained from heat radiation balance. Taking into account the absence of vertical thermal advection, the night coo may be computed:

$$E - V + \lambda \frac{\partial T_1}{\partial z} - C_p A \frac{\partial \theta}{\partial t} = O_1 \qquad E = \epsilon(\sigma T_0^4 - G).$$

Where T_0 = surface temp., T_1 = soil temp., θ = the potential air temp., λ = the heat conducti of the soil, A = the air exchange coefficient, C_p = the specific heat of air under constant press G = the reflected atmospheric radiation, V = the heat used for evaporation, σ = the Boltzm constant, ϵ = the absorption coefficient of long-wave radiation, z = the altitude and t = the coordinate. Two experiments conducted in 1957 at Martonvásár-Erdöhátpuszta proved the p tical usefulness of the REUTER method. *Subject Headings:* **1. Nocturnal cooling foreca 2. H. Reuter's method of forecasting 3. Martonvásár-Erdöhátpuszta, Hungary.**—*E.K.*

12L–538 551.509

Masumura, K., **On the late frost at Owase.** *Japan. Meteorological Agency, Memoir Industrial Meteorology,* 21(2) :83–87, **1958.** fig., 6 tables. In Japanese; English summary 87. **DWB**—The author investigated the condition of the formation of late frost quantitati for the purpose of forecasting in the southern part of Mie Prefecture from data for 17

obtained by the Owase Weather Station from April 1939 to May 1956. Working out the correlation between the minimum air temp. on the upper layer (700 mb) over Wajima at the middle of the frosty night, the author classifies the decrease in temp. into three types and observes different characteristics of the minimum air temp. according to these types, air temp. at 18h 00m of the previous day and wind-velocity at the time when frost occurs. Results are summarized as follows: the distribution of minimum air temp. and minimum grass temp. shows their peaks respectively at 0°–2°C and −1°–5°C, and distribution of difference between them shows its peak at 4°–5°C; 80% of the frost occurred when the wind direction was north-westerly and velocity 1–2 m/s; 73% occurred under clear weather. It is suggested that Brunt's formula be applied for deducing the minimum air temp. *Subject Headings:* **1. Frost forecasting 2. Frost formation 3. Owase, Japan.**—*K.C.*

12L–539 551.509.532

Medzhitov, R. M., **K prognozu zamorozkov.** [Frost forecasting.] *Meteorologiia i Gidrologiia*, Leningrad, 6:25–28, June 1959. 2 figs., 4 refs., 2 eqs. **DWB, DLC**—The correctness of atmospheric frost forecasts made by empirical formulas of the form $T = aT_{13} + bU_{13} + C$ (where T = minimum air temperature, T_{13} and U_{13} = temperature and relative humidity of the air at 13 hrs) and the correctness of the frost forecasts for the air and the soil surface by the formulas of Berliand follows, viz: $T = T_0 - (A + P)$ and $\theta = \theta_0 - (B + S)$ where T = minimum temperatures of air and soil surface; T_0 and θ_0 = air temperature in instrument shelter and at soil surface, at 19 hours; A and B = parameters reflecting dependence of lowered temperature upon heat balance condition of underlying surface; B and S = parameters reflecting dependence of night cooling upon initial distribution of temperature along the vertical. If sufficiently successful forecasts are considered those with a maximum difference of 2°C between forecast and actual minimum temperature the verification of the forecast is on the average 64%, with the Berliand formula for min. air temperature and 72% with the empirical formula. The former gives values on the average 1.7°C higher than the actual while the empirical formula gives values 0.8°C lower than the actual. The mean square error in forecasting with the Berliand formula is 2.7 against 2.5 with the empirical formula. The quality of the forecasts of atmospheric frosts made with the Berliand formula is somewhat better on cloudy than on clear and partly clear days. The computation of multipliers for taking into account the effect of local conditions as indicated by the parameters $(A + P)$ and $(B + S)$ is illustrated. The method of Berliand gives relatively better results for open and open localities when evening cloudiness and winds are retained, during the night, i.e., when the frosts are more infrequent. On days with predominating radiation weather conditions i.e., when frosts are most frequent, the night temperature is actually considerably lower than as forecast by the method of Berliand. The indices and coefficients in the formulas reflecting the dependence of night cooling upon initial vertical distribution of temperature fundamentally act also in one direction—they raise the forecast temperature. The empirical formulas give very satisfactory results if they are used for the point for which they were derived. *Subject Heading:* **1. Frost forecast evaluation.**—*I.L.D.*

12L–540 551.509.532:551.524.37:634

U. S. Weather Bureau, **Local temperature and fruit frost activities for Weather Bureau Airport Station, Columbia, South Carolina, 1956–1957 season.** (1958?) 13p. numerous tables, charts, map (fold). Carbon of typescript. **DWB** (M24.37 U587ft)—A standard report on fruit frost forecasts and their distribution in central So. Carolina during the 1956–1957 season, with data for each month Nov. 1956–April 1957, a forecasting guide chart, comments of growers, frost protection procedures and miscellaneous data are included. *Subject Headings:* **1. Fruit frost forecasts 2. Columbia, S. C.**—*M.R.*

Cloud—Precipitation—Rime—Glazed Frost (551.509.54)

See also: **Calculation of amount of precipitation** (Dmitrieva, Karpova), 12L–218; **Forecasting the snowfall amount** (Kanazawa), 12L–233; **Seven sleepers rule** (Hoffmeister), 12L–655.

12L–541 551.509.54(437)

*Drogajcev, D. A., **K dlouhodobé předpovědi srážek v Československu.** [Long range forecasting of precipitation in Czechoslovakia.] *Meteorologické Zprávy*, Prague, 11(4/5):119–122, 1958. 3 figs., table, 12 refs. Czech and Russian summaries p. 119. **DWB, DLC**—Meridional transfer of heat and cold in early winter is analyzed both qualitatively and quantitatively. Long-period variations of such transfer are physically closely linked to variations of the atmospheric circulation and hence to changes in precipitation during the growing period from one year to

another. This is shown by the examples of the drought in 1947 and the moist year of 1951. T correlation between precipitation amount from April to July, and the meridional temperature tra fer index for the preceding early winter is shown for a 19-yr series. *Subject Headings:* **1. Lo range precipitation forecasting 2. Czechoslovakia.**—*Transl. of author's abstract.*

12L–542 551.509.54:551.553.21(521.

Kimachi, T., **A preliminary research for forecasting the winter monsoon precipitation San-in District, Japan.** *Journal of Meteorological Research,* Tokyo, 9(5):356–360, July 19 5 figs., 3 tables, 10 refs., eq. In Japanese. **DWB, DLC**—In relation to the forecasting shower precipitation during the winter monsoon, the author considers the following: the beginni and termination of the shower season, the relation between cold air and shower during the passa of the cold front, and the relation between mean base of upper air layers and the jet. T shower season begins in Nov. and ends in the middle of March. Data were obtained from 10 year weather charts at Yonezu (1940–50): on cloudiness and rain, on the variations of trou and shower. It is noted that at the passage of trough the precipitation stopped in spring-autun but continued in winter, that short-showers were frequent in Dec. and Jan. and long-showers w frequent in February; the former was within 24 hours after the passage of trough and the lat continued on over 24 hours after the passage. The convective cloud up to the height of 600 was explained with respect to temperature during 1953–1954 at Yonezu and other regions. It concluded that polar air causes the shower and its direction determines the beginning and termi tion of shower (Tab. 3). *Subject Headings:* **1. Monsoon precipitation forecasting 2. Wi moonsoon 3. San-in, Japan.**—*K.C.*

12L–543 551.509.54:551.577.37(521.61):551.55

Nakayama, A., **On the so-called secondary orographic rainfall, Pt. 4.** *Journal of M orological Research,* Tokyo, 7(10):672–677, Dec. **1955.** 6 figs., 4 tables, 12 refs., 3 eqs. Japanese. **DWB, DLC**—The author has attempted to analyze a heavy rainfall, limited to a l area, which is brought in by a small convergence line in the low layer. He has tabulated vertical distribution of meteorological elements on Aug. 24, 1951 in Sizuoka Prefecture the c acteristics of rainfall during the strong south wind, and described the relation between the graphic influence and the triggering action and compared it with the track chart of the air ma on the level of 500 mb and 700 mb observed on Aug. 12, 1953. The atmospheric instability the mountains, the values of acceleration of circulation in the wet layer relating to wind direc and velocity on southeast-southwest at 1000 m, 2000 m, 3000 m, respectively, were tabulate the period of June and August between 1951–1953. *Subject Headings:* **1. Orographic rai studies 2. Local rainfall triggering 3. Sizuoka, Japan.**—*K.C.*

12L–544 551.509.54:551.515.23:551.577.21

Nishikawa, T., **On the forecasting of rainfall in Wakayama Prefecture.** *Journal of M orological Research,* Tokyo, 10(12):1041–1047, Dec. **1958.** 10 figs., 3 refs., eqs. In Japa **DWB, DLC**—In order to investigate the distribution of orographic rain, this paper has sele two typhoons: one on Sept. 25, 1953 and the other in 1957 (No. 10), and has shown and cussed an orderly method of analysis of weather chart, the typhoon passage, and geostrophic profiles. The topographic variation and three hours distribution of precipitation during typhoon. It is concluded that for dependable forecasting of local rainfall amount the p application of inclination chart of orography and wind direction and speed would be the factors. *Subject Headings:* **1. Rainfall forecasting 2. Orographic rainfall 3. Wakay Japan.**—*K.C.*

12L–545 551.509.54:551.578.1(521.51)

*Nomoto, S., **Forecasting of precipitation amount by river basins in Yamanashi Prefec** *Journal of Meteorological Research,* Tokyo, 10(8):680–685, Aug. **1958.** 6 figs., 3 tables, 4 eqs. In Japanese. **DLC**—This is an intermediate report of a method for forecasting prec tion caused floods in Yamanashi Prefecture for use by the local administration. A fundam assumption is indicated in the result made by study of both regional precipitation and orog precipitation, which are influenced by ascending air currents. The formula is: R (precipita $= Rs$ (storage method) $+ Rw$ (orographic precipitation). *Subject Headings:* **1. Precipit forecasting 2. Areal precipitation estimation 3. Yamanashi Prefecture, Japan.**—*K.C.*

12L–546 551.509.54:551.578.1(522.7

Ogawa, Y., **Basic investigation for rainfall forecast at Kagoshima, Pt. 1.** *Journ Meteorological Research,* Tokyo, 10(7):613–614, July 1958. 4 figs., 2 tables, eqs. In Jap **DLC**—A statistical study of ground observed rainfall data between June and July and m

and quarterly data of Kagoshima from 1915–1956 are made for rainfall forecasts. The results of statistical treatments are tabulated and graphed. The ratio of mean rainfall from June–July to annual rainfall is about 35% and their correlation coefficient is 0.8. Rainfall in a season is more deeply related to daily maximum rainfall in the season than number of rainfall days in the season. *Subject Headings:* **1. Rainfall forecasting 2. Rainfall data 3. Kagoshima, Japan.**—*J.H.W.*

12L–547 551.577.2(521.27):551.509.54(52)

§Okuyama, I., **On forecasting rainfall in Tokyo.** *Journal of Meteorological Research,* Tokyo, 10(11):923–934, Nov. **1958.** 13 figs., 8 tables, ref. in Japanese. **DWB, DLC**—For the purpose of forecasting the weather and rainfall in Tokyo district, the author selected the data from 16 areas in the vicinity of Tokyo for the period from Jan. 1953 to Dec. 1957. Tables show monthly variation and classification of distribution patterns of air pressure, frequency of precipitation, the different amount of rainfall in each area, and the frequency of heavy rain. The efficiency of forecasting rain at Tokyo was 41.8%. *Subject Headings:* **1. Rainfall amount forecasting 2. Tokyo, Japan.**—*K.C.*

12L–548 551.509.54(52)

Tomioka, S., **On the work sheet of rainfall forecasting.** *Journal of Meteorological Research,* Tokyo, 8(9):609–611, Oct. **1956.** 5 refs., eqs. In Japanese. **DWB, DLC**—The main factors considered in this paper are: the northern hemisphere chart at 700 mb, three day mean chart at 700 mb, aerological chart at 500 mb, 700 mb and 85 mb, thickness chart at 500–800 mb, zonal index based on cross section of zonal wind at 700 mb, and emagram and premigram. All factors were put on a work sheet accompanied by a brief discussion of characteristics. The forecasting of precipitation involves the following factors: hourly variation of precipitable water, advection of water vapor, and intensity of ascending air currents by converging air. Using the data obtained in 1948, 1949, 1950 the author selected the calculation of 50 mm rainfall in a day, in order to investigate the relation between other meteorological factors and rainfall over 50 mm, and he concluded that: there were above 8 gr of mixing ratio at 700 mb, above 80% of mean humidity at the upper layer, and heavy rainfall was due to a high humidity in air circulation and converging base. *Subject Headings:* **1. Rainfall forecasting 2. Forecasting techniques 3. Rainfall data 4. Japan.**—*K.C.*

12L–549 551.509.54:551.579.1(521.24)

Uchida, M., **On the precipitation coefficient for each river basin in Gumma Prefecture.** *Journal of Meteorological Research,* Tokyo, 10(11):952–954, Nov. **1958.** 8 figs., 2 tables, 2 refs. In Japanese. **DWB, DLC**—This study was made with the data obtained during the months of June through November from 1953 to 1957. The precipitation coefficient for each river basin is influenced by pressure distribution, and by such activity as the Pacific cyclone, Japan sea cyclone, cyclones that passed through the mainland, stationary front and trough at high latitudes. *Subject Headings:* **1. Precipitation coefficient 2. River basins 3. Gumma Prefecture, Japan.**—*K.C.*

12L–550 551.509.54:551.576.1:629.135.2

Yin, L. C., **How to forecast jet-plane contrail?** *Meteorological Bulletin,* Taipei, Formosa, 1(3):39–41, Sept. **1955.** fig., 3 refs. In Chinese. **DLC** (Orientalia)—This paper deals with a theoretical problem of contrail, namely, the formation of condensation trails, studied by H. Appleman, who experimented with the rate of probability by using B-47 jet aircraft for the period of February 12–20 in 1953. General remarks on the method for the formation of relative humidity curve and including saturation, evaporation, relative range of air pressure and temperature, and higher chart at 200 mb. The results of the experiments show that in one hundred flying-time the highest (62%) was formed in the extreme north of the jet stream, the next (32%) was in the middle of secondary tropical jet stream and the third (25%) was in the south of the same level. The observation of convective currents and correlation with jet stream trajectory would be an important factor in forecasting problems. *Subject Headings:* **1. Contrail forecasting 2. Jet aircraft contrails 3. Contrail formation.**—*K.C.*

Cloud—Precipitation (551.509.54.1:551.509.54.2)

12L–551 551.509.54.1

Meteorological Office Discussion [on] Forecasting cirrus, Nov. 17, 1958. *Meteorological Magazine, London,* 88(1041):74–83, March **1959.** 9 refs. **DWB, DLC**—A discussion was held at the Royal Society of Arts and the main speakers were R. J. Murgatroyd and J. Harding. Giving his opinion on high clouds, the first speaker said that when fog or thick lower clouds inter-

vene, upper clouds are not visible. The high cloud bases rise from about 24,000 ft at 80°N 40,000 ft at the equator, with the thickness of cloud being 3000 to 5000 ft. HARDING sp about the work of photographic reconnaissance aircraft and their problems. He gave account how an aircraft flying over the Pacific suffered a double "flameout" at a temperature of —7 due to a bump in a cirrus cloud. In conclusion he stressed forecasters indebtedness to those v have published statistics and other information on cirrus clouds. *Subject Headings:* **1. Cir cloud forecasting. I. Murgatroyd, R. J. II. Harding, J.**—*A.H.K.*

12L–552 551.509.5

§Visscher, H. B., **Cloud forecasting.** (In: Visscher, H. B. et al., **Development of practi short-range, weather prediction techniques.** Atlanta, Georgia, Eastern Air Lines, Dec. 19 p. 80–98. 10 figs., 6 tables.) **DWB** (M09.3 E13d)—The purpose of this study is to dev techniques for forecasting the cloud areas of the continental U. S. with emphasis on macro ra than micropatterns. The first part of this report contains an analysis of the problem. The consists of a discussion of low level advection and sky condition forecasts. Cloud patterns the synchronous 500 mb analysis are treated in detail. Sky conditions in the areas swept by line of maximum warm advection for 27 hours are illustrated. Clear skies in one area are chan Five hundred mb contour analysis of Jan. 5, 1950, 1000 EST is shown. Maps show clear s west of a 500 mb ridge line. Sample forecasts and % correct are tabulated. *Subject Headi* **1. Cloud forecasting 2. Forecast accuracy 3. United States.**—*E.Z.S.*

12L–553 551.509.54.2:551.57

Karyu, Y. and Arima, S., **On the possibility of the forecasting of heavy rainfall near Sendai River.** *Journal of Meteorological Research,* Tokyo, 11(10):822–828, **1959.** 15 fig tables, 5 refs. In Japanese; English summary p. 822. **DWB, DLC**—The heavy rainfall the night of July 27, 1957 to the morning of 28 was investigated. The rainfall is due to a tionary and active front, and the locality of this rain such that a heavy rainfall was concentr over a small area along the Sendai River suggests another additional mechanism. The obse rainfall amount is far different from the one estimated dynamically taking into account of graphic effect, but is of the same order of magnitude as estimated, with the convergence of in ing water vapor aloft or the releasable amount due to the convective instability. *Subject H ings:* **1. Heavy rainfall forecasting 2. Local rainfall studies 3. Sendai River, Japa** *Authors' abstract.*

12L–554 551.509.54.2:551.577.21

Miyoshi, N. and Sano, K., **Quantitative precipitation forecasting in Shikoku.** *Journ Meteorological Research,* Tokyo, 11(10):851–858, **1959.** 10 figs., 5 refs. In Japanese; En summary p. 851. **DWB, DLC**—This is a summary of discussions on the forecasting of scale precipitation in Shikoku district. In this study, for the computation of vertical velo for each layer, the numerical prediction method of K. ISHIWARA is applied. In lower laye km mesh size is adopted for computing the topographical vertical velocity. The method is a to lows which passed south coast of Shikoku during the periods from April 30 to May from Oct. 19 to Oct. 20 and on Nov. 21, 1955. The result obtained is satisfactory in the g trend of distribution, but is not satisfactory enough quantitatively. *Subject Headings:* **1. C titative rainfall forecasting 2. Shikoku District, Japan.**—*Authors' abstract.*

12L–555 551.509.54.2:551.577.3

Niigata, Japan. Meteorological Observatory, **On the heavy rainfall in Hokuriku D on July 7–8, 1957: forecasting of the local heavy rainfall.** *Journal of Meteorological Res* Tokyo, 11(12):959–975, Dec. **1959.** 44 figs., 10 refs. In Japanese; English summary p **DWB**—Principal results obtained are as follows: 1) heavy rainfall occurred by Bai-u fron ning through Hokuriku district and the role of upper cold vortex around Japan Sea is imp for heavy rainfall; 2) movements of several rainfall groups were regular and systematic; at low level was recognized by cross-section analysis and moist warm air prevailed around th 4) local upper analysis was attempted by differential analysis and 5) orographic precipitatio calculated and, using premigram, precipitation by release of convective instability was al culated. *Subject Headings:* **1. Heavy rainfall forecasting 2. Bai-u rainfall forecasti Hokuriku District, Japan.**—*Author's abstract.*

12L–556 551.509.54.2:551.513:551.577.

Takenaga, K., **On the forecast of heavy rainfall in Bai-u season.** *Journal of Meteor Research,* Tokyo, 11(1):52–58, Jan. **1959.** 11 figs., 4 refs. In Japanese. **DWB, DLC** purpose of this paper is to describe an objective method of forecasting of heavy rain during

season in western Japan. Using two examples of heavy rain, that of June of 1953 and of July 1957, the author describes some conditions which occur in association with local heavy rain: inflow of humid air in the middle layer, appearance of strong wind in the lower layer, and control of SW wind at the earth surface. Each condition is analyzed and illustrated in figures and the related problems of the passage of humid air, systematic migration of subtropical circulation, and change of westerly wind wave are discussed. Three factors of heavy rain pattern are as follows: 1) in case of the root of air pressure base at the west of Baikal Lake is plus (+) and that is minus (−) at 125°E; 2) the root of air pressure base at Kamchatka is + contrary, that is −, at 125°E; 3) all bases are at + and that minus at 125°E. The numerical forecasting would be most dependable at the present time, since the objective method for this area seems to be very difficult. *Subject Headings:* **1. Heavy rainfall forecasting 2. Bai-u season 3. Numerical forecasting 4. Objective forecasting 5. Western Japan.**—*K.C.*

12L–557 551.509.54.2:551.577.37

Yamamoto, T., **Some considerations on the forecasting of small scale heavy rainfall.** *Journal of Meteorological Research,* Tokyo, 11(11):889–893, **1959.** 3 figs., table, 13 refs. In Japanese; English summary p. 889. **DWB, DLC**—Distributions of heavy rainfall amount, on a small scale, are related with precipitable water, upward component of wind, and its duration. In the numerical method, upward components of wind by orography are possible to estimate rather successfully by use of surface data, but parts of upward components by dynamic effects and convective instability are not calculated effectively. In the synoptic method, maximum rainfall zones are found along the jet stream e.g., two wind maxima are found on 500 mb chart; one is "subtropical jet stream," extended from mid-China eastward to Japan and the other is called "converging belt" or "jet stream of north Pacific tropical frontal zone," extended from the east to northeast of Japan. Along these jet streams, maximum rainfall zone illustrates the influence of orographic effect. A table indicates two rainfall cells at this time, both moving eastward. These correspond to parts of large pressure gradient in a fig., one due to the converging belt and the other to direct effect of depressions, and a table also indicates that the rainfall intensity by these cells is under orographic effect. From this illustration, distribution of rainfall amount by dynamic effect and convective instability are estimated rather successfully by synoptic method. For the forecasting of small scale heavy rainfall are required both numerical method and synoptic method together. *Subject Headings:* **1. Rain forecasting 2. Numerical forecasting 2. Synoptic conditions for heavy rainfall 4. Orographic effects 5. China 6. Japan.**—*Author's abstract.*

Visibility—Mist—Fog (551.509.55:551.509.56)

12L–558 551.509.55

Nebelwarndienst in Europa. [Fog warning service in Europe.] *Wetterlotse,* Hamburg, No. 138:259–260, Nov. **1958. DWB**—Fog warnings are transmitted during "poor visibility" as an aid to navigation on the following rivers in Europe: the Maas and Schwenngen in Holland, the Westerschelde in Belgium, the Weser and the Elbe in Germany, as well as the Thames in England. Regions and locations of the transmitting stations are given. *Subject Headings:* **1. Fog warning services 2. Europe.**—*W.N.*

12L–559 551.509.55:551.575.1:551.594.11

Serbu, G. P. (*U. S. Naval Res. Lab., Wash., D. C.*), **Atmospheric electricity and advection fog forecasting.** *Conference on Atmospheric Electricity, 2nd, Portsmouth, N. H., May 1958, Proceedings,* issued **1958.** p. 239–240. fig. **DWB** (M(055) C748pr)—The report gives a brief summary of the results of a study conducted by the U. S. Naval Research Laboratory on atmospheric electricity and advection fog forecasting at Argentia, Newfoundland. The importance of including wind-speed and wind-direction data in short-term fog forecasting is noted. *Subject Headings:* **1. Advection fog forecasting 2. Atmospheric electricity 3. Argentia, Newfoundland.**—*N.N.*

12L–560 551.509.55:551.591.31

U. S. Air Force. 9th Air Weather Group (MATS), McGuire Air Force Base, New Jersey, **An objective technique for forecasting morning visibilities at McGuire Air Force Base, N. J.** Prepared by Detachment 22, 9th Weather Group. Feb. **1959.** 7 p. 2 tables, 4 graphs. **DWB** (M09.325 U5815ob)—The objective forecast of morning visibilities over the McGuire AFB shows that frontal passages, radiation fog and snow are the causes of the most serious bursts. In order to aid any duty forecaster, details on the graphical and statistical methods of prediction, verification and application of this technique are contained in this report. *Subject Headings:* **1. Visibility forecasting 2. Objective forecasting methods 3. McGuire Air Force Base, N. J.**—*N.N.*

Thunderstorms (551.509.56)

12L–561 551.509.56:551.558.1:551.51

Gus'kova, V. G., **Proverka prognozov groz i livneĭ sostavlennykh po metodu N. S. Shi kina.** [Verification of thunderstorms and shower forecasts made by the method of N. S. Shi kin.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 83:39–41, **1959.** 2 tables, **DWB**—The method of layers is used as the basis for Shishkin's method of forecasting. kinetic energy is released and used during the development of convectional clouds under conditi in which the vertical temperature gradient exceeds the wet adiabatic gradient. The energy is u for development of the compensative movements in the surrounding air. This method make possible, with the data from aerological soundings, to compute the probable vertical force of convectional clouds and to forecast thunderstorm and showers over a definite territory. changes in the kinetic energy, according to this layer method, are computed with the given equa and with wet and dry adiabatic vertical temperature gradients and the known degree of cloudi as well as other factors, observed by 16 stations of the Moscow Region. Observations for s range forecasting were made from April 16 to Sept. 16, 1957, by the Central Institute of F casting. The percent of correct forecasts by both methods used from June to November presented in two tables, for thunderstorms and showers. The percent correct of the forec compared with the actual observed weather conditions are found to average for six months—6 for the showers and 82% for the thunderstorms. *Subject Headings:* **1. Thunderstorm fore verified 2. Shower forecast verification 3. Short range forecasting.**—*N.P.S.*

Tropical Cyclones, Waterspouts, Tornadoes (551.509.57)

12L–562 551.509.57:551.515.2(261)

Dunn, Gordon E. (*Warning Center, U. S.*), **History and development of hurricane f casting in the Atlantic area.** (In: Caribbean Hurricane Seminar, Ciudad Trujillo, Feb. 1 **Final Report of the Seminar,** pub. **1956.** p. 95–104. 6 refs.) **DWB**—The first mentio Atlantic hurricanes appears in the logs of the voyages of Christopher Columbus to the World in 1495. Benjamin Franklin in 1743 found that the storm system moves and the m ment is not controlled by the surface wind. Contributions by Farrar 1819, Redfield 1831, 1831, Piddington 1839, are noted. Technical developments and growth in basic understan since 1844 are outlined. *Subject Headings:* **1. Hurricane forecasting history 2. Carib Hurricane Seminar 3. Atlantic Ocean.**—*E.Z.S.*

12L–563 551.501.9:551.509.57:551.515.2(

Dunn, Gordon E. (*Miami Hurricane Warning Center, U. S.*), **Network requirement hurricane forecasting.** (In: Caribbean Hurricane Seminar, Ciudad Trujillo, Feb. 1956, J **Report of the Seminar,** pub. **1956.** p. 156–159) **DWB**—Procedures for hurricane forecas in the tropics and subtropics have not been stabilized sufficiently to permit definite recomm tions for specific network density. However, the Caribbean area should work toward devel a network that fulfills the recommendations of the Committee for Synoptic Weather Inform of the IMO, Paris 1946. Efforts should be made to secure more aircraft reconnaissance more inflight reports from commercial aircraft. Radar coverage should be expanded. *Su Headings:* **1. Hurricane networks 2. Hurricane forecasting services 3. Caribbean Hurr Seminar 4. Caribbean Sea.**—*E.Z.S.*

12L–564 551.509.57:551.515.2:551.5

Kusano, K. and Shiraishi, Y., **On the objective forecasting of precipitation amount i Kitakami Basin caused by typhoon.** *Journal of Meteorological Research,* Tokyo, 11(8) 666, Aug. **1959.** 6 figs., 5 tables, 8 refs. In Japanese; English summary p. 659. **DWB,** —Two objective methods were studied: first, in the qualitative forecasting two predicto used, viz., effective moisture content at 700 mb level and track of typhoon. According to the rainfall amount, the rainfall is classified into three classes: heavy, moderate and slight and s the following six predictors are selected for the quantitative forecasting: south component of at 700 mb level, meridional pressure gradient, effective moisture content, 500 mb vorticity tion, convective instability and length of time from routine observation time to beginning of fall. A co-axial diagram is then constructed by these predictors against daily rainfall a The forecastings of precipitation caused by 12 typhoons in 1958 were tested by the first m 9 cases achieving a fair measure of skill score. *Subject Headings:* **1. Typhoon precipi forecasting 2. Forecast evaluation 3. Kitakami River Basin, Japan.**—*Authors' abstra*

Forecasts for Special Purposes (551.509.58)

12L–565 551.509.58:55

*McCutchan, Morris H. et al., **Objective ceiling-forecast study for Colorado Springs, rado.** Ent AFB, Colorado, NORAD Forecast Center, 3d Weather Group, Nov. **1957.**

15 figs., 6 tables. ASTIA reproduction of typescript. **DWB** (M:629.13 M113ob)—A systematic objective forecast study for prediction of ceilings ≦ 5000 ft at Colorado Springs during Nov.–Dec., Jan.–Feb., and March–April, respectively. Forecast periods were 06–16h and 20h–08h M.S.T. with forecasts issued at 0630 and 1830 hrs, respectively. Data for Nov.–Dec. 1949–55 were obtained from Denver surface charts. Parameters included circulation (pressure gradient index of upslope or downslope flow at Colorado Springs, six-hr pressure gradient index change (intensification or weakening), location of "high" center and "low" center; pressure tendencies (3-hour) at Pueblo and Denver) and moisture parameters temperature-dew point spread at station and minimum-temperature-dew point spread at three nearby stations. Procedures devised from this study are outlined, monograms presented for making prediction check lists and data on probabilities for various categories, persistence indicated, synoptic examples included and verification indicated. Skill score of .49 (77% correct) was obtained for text on November 1957 data. *Subject Headings:* **1. Objective forecast studies 2. Ceiling height forecasting 3. Colorado Springs, Colo.**—*M.R.*

12L–566 551.509.58:551.551.5:551.557:629.13:551.511.6

*Medzhitov, R. M., **Primenenie kriteriia Richardsona k prognozu boltanki samoleta.** [Use of the Richardson criterion for forecasting airplane bumpiness.] *Minsk. Gidrometeorologicheskaia Observatoriia, Sbornik Rabot,* No. 2:23–27, **1959.** table, 2 refs. **DWB**—On the basis of five year data (1951–1955) of visual observations on the bumpiness of the LT-2 airplane the author attempts to determine the forecast value of the Richardson criterion which states that weak bumpiness occurs at values of RiL4 and moderate bumpiness at Li ≦ 0.5. Airplane ascents were made close of 0400 and 1600 o'clock local time. Values of the Ri number were determined for atmospheric layers 0.22–0.5, 05–1.0, 1.0–1.5, 1.5–2.0, 2–3, 3–4, and 4–5 km on the basis of wind observations and temperature soundings. The results of the verification of bumpiness forecasts of values of the Ri criterion ranging from 0.5 to 20 are presented in a table. An analysis of the data showed that verification of forecasts of the presence of bumpiness amounted to 54%; verification of the forecasts of the absence of bumpiness amounted to 78% and the total verification of forecasts was 74%. An analysis of the five-year data showed that the use of the Ri number as a criterion of bumpiness cannot always yield a satisfactory solution of the problem of forecasting it. Accurate critical values of the Ri number for different atmospheric layers provide an equal verification of forecasts of the presence or absence of bumpiness but the verification of such forecasts still remains low (50–60%) i.e., not higher than blind and passive forecasts. *Subject Headings:* **1. Airplane bumpiness forecasting 2. Richardson number 3. Forecast verification.**—*T.L.D.*

12L–567 551.509.58:629.13:551.551.5:551.557:629.13

§Viaut, A. (*Director, French Weather Service*), **Influence des conditions météorologiques sur le vol des avions à grandes performances.** [Influence of the meteorological conditions on the flight of high powered aircraft.] *Docaéro,* Paris, No. 56:49–59, May **1959.** 6 figs., 4 refs. **DLC**—Study of the repercussions of the atmospheric factors on the behavior of jet planes during flights. In order to determine the optimum route and minimum flight-time, it is essential to know with sufficient exactness the values of the temperatures to be encountered by the engines when flying, during climbing and at the level of the trip. The author sets out the method used to determine the "minimum flight-time" track, based on the cognizance of the pressure field at the various levels. Winds play a leading role in high altitude flights and it is necessary to have full information on the jet stream topography to perform economical flights. The optimum heights for future flights depend on the stratospheric winds which are very different from those in the lower regions. It seems that the optimum heights for flights should be found in the lowest kilometers of the stratosphere and comprise; at the latitude of France, between 13 and 20 km; more toward south between 15 and 24 km and more toward north, between 8 and 15 km. Clear air turbulence at high levels can affect the rapid airplanes strongly, whereas humidity and hydrometers seem to present less influence at high altitudes owing to the low rate of water vapor in these regions. The detection of clouds and the measurement of visibility are also dealt with. *Subject Headings:* **1. Minimum flight plans 2. Flight forecasting 3. Stratospheric wind effects on high altitude flights 4. Jet stream effects 5. Atmospheric turbulence.**—*A.V.*

12L–568 551.509.58:551.579.4:551.509.329

Bachet, Noël, **Méthode graphique d'annonce des crues.** [Graphical method of flood forecasting.] *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Transaction*], Vol. 3, pub. **1958.** p. 219–233. 10 figs., 14 eqs. French summary, p. 219. **DWB** (M(06) 1611g)—In this analysis of the graphical method of flood forecasting, the author also derives values for the effects of attenuations. The last part of the paper

is devoted to answering questions on runoff variability. *Subject Headings:* **1. Flood forecasti techniques 2. Graphical flood forecasting.**—*N.N.*

12L–569 551.509.58:639.2(262

Baĭdal, M. Kh. and Zhiliaev, F. G., **Opyt gidrometeorologicheskogo obsluzhivaniia osenn putiny na severo-vostoke Kaspiia.** [An experiment in hydrometeorological service for the f fishing season in the northeastern Caspian Sea.] *Meteorologiia i Gidrologiia,* Moscow, No. 10:3 33, Oct. 1959. **DWB, DLC**—The hydrometeorological services for forecasting of synoptic a hydrological processes, necessary for the safety of the fishing fleet, are described in detail. Spec weather conditions, rapid changes in the water temperatures and formation of ice are outlined the period of the middle of Nov. This information about the critical season is very import to the fishing industry. *Subject Headings:* **1. Hydrological forecasting services 2. Fish industry 3. Caspian Sea, U.S.S.R.**—*N.P.S.*

12L–570 551.509.58:551.57

Barabash, A. Ia., **Prognoz maksimal'nogo raskhoda polovod'ia gornoĭ reki Inguri.** [Fc cast of the maximum discharge of the spring floods of the mountain Ingur River.] *Meteorolo i Gidrologiia,* Leningrad, No. 12:37–38, Dec. 1958. 1 fig. **DLC**—Melt waters play the dominant role in the spring floods of the Ingur River. Hence, the forecast of maximum fl discharge is based upon the snow supplies in the mountains and the march of air temperat during the period of snow melting. In order to forecast maximum water discharge at Dzhvari, sum of winter precipitation at individual weather stations distributed only at corresponding he zones were determined with a hypsographic curve which permitted the computation of the a characterizing each station. The total precipitation of each station was multiplied by a fa representing the ratio of the area of the basin of the height zone of a given station to the t basin area. The results obtained were totalled and compared with maximum flood discharge shown on a graph. The reliability of this relationship is 87%, for a relationship of 47%. *Subj Headings:* **1. Flood discharge forecasting 2. Ingur River, Georgian S.S.R. 3. Dzhv Georgian S.S.R.**—*I.L.D.*

12L–571 551.509.58:551

Barisnikov, N. B., **Prognoza de lungă durată pentru apele mici de vară si de toam** [Long range forecasting of minimal discharge in the summer-autumn period.] *Meteorola Hidrologia şi Gospodarirea Apelor,* Bucharest, 3(2/3)::62–67, **1958.** 4 figs., 9 refs., 2 eqs. E lish résumé p. 138. **DWB**—This paper gives a review of the existing forecasting methods the computation of the minimal discharge during summer and autumn; a method elaborated by author at the Hydrometeorological Institute in Leningrad and which is based on the general of the processes of atmospheric circulation is explained. *Subject Headings:* **1. Minimum charge forecasting 2. Long range precipitation forecasting.**—*Author's abstract.*

12L–572 551.509.58:551.5

Berg, V. A., **Osovremennykh metodakh prognoza temperatury vodoemov.** [Modern m ods of forecasting the temperature of water reservoirs.] *Vsesoiuznyĭ Gidrologicheskiĭ S" Trudy* [Proceedings of the 3rd All Union Hydrological Conference, Oct. 1957], Vol. 4, is **1959.** p. 251–258. 2 figs., 5 eqs. **DWB** (M79 V985tr)—After a historical review and cussion of the basic differential equation for heat conductivity of water and the different approa for its solution, the influence of lake bottom soil and ice cover on the solution of this equatio described. The necessity for simultaneous development of methods for calculating influenc streaming on turbulent heat conductivity is stressed. An experimental solution with models canals) is proposed. *Subject Headings:* **1. Reservoir water temperature forecasting 2. H casting methods.**—*J.N.*

12L–573 551.509.58:55

Bogdanova, E. L., **Prognoz pritoka vody k Volkhovskoĭ gidroelektrostantsii.** [Forecar the inflow of water to the Volkhov Hydroelectric Power Plant.] *Moscow. Tsentral'nyĭ In Prognozov, Trudy,* No. 75:11–28, **1958.** 7 figs., 3 tables, 10 refs., eqs. **DWB, DLC**—A de study of all factors connected with the working out of the forecasting method presented in paper shows that the hydrometric network existing on the rivers of the Il'men-Volkhov makes it possible to determine the inflow of water in Il'men Lake with an accuracy that is clo the accuracy of its computation by the method of the lake's water balance. The natural sm ness of the water flow makes it possible to predict the inflow of water into the lake with a advance even at the abatement of the spring high water. *Subject Headings:* **1. Hydrolo forecasting 2. Lake water level forecasting.**—*A.M.P.*

12L–574 551.509.58:551.579.4

Chebotarev, N. P., **Issledovanie elementov gidrografa polovod'ia, ikh izmenchivosti i obespechennosti.** [Investigation of the elements of a flood hydrograph, their variability and probability.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 9:121–136, **1957.** 2 figs., 6 tables, 9 refs., 43 eqs. **DWB**—The author derives a series of equations for studying the duration of and variation of flood waters and its elements, the variation of the total flow, and of maximum discharge of flow of flood waters, and the influence of the area of basins upon the probability of maximum discharge. The duration of flood waters is considered as the sum of time of snow melt and runoff. The duration of snow melt can be calculated by means of the equation

$$t_c = \frac{D_{ln}(2\varphi x_0)}{\varphi C\theta}$$

where t_c = time of runoff; x_0 = amount of melt water; φ = parameter depending upon relief and vegetation cover; D = rain water; $C\theta = \bar{W}$ = amount of heat expended in melting of snow. This formula can be used to construct a hydrograph and to forecast the end of snow melting. The formula

$$T = \frac{D_{ln}(2\varphi x_0)}{\varphi C\theta} + \frac{L}{B\theta^n}$$

serves to determine approximately the duration of flood water and to forecast the end of flood water from data on water supply of snow up to the start of snow melt (x_0) and the mean positive air temperature during the period of snow melt. The coefficient of variation of duration of flood water is equal to the mean arithmetical value of the coefficients of variation of the snow melt and runoff periods. For the former

$$C_{vt} = \sqrt{\left[\frac{D}{\varphi C\theta\bar{x}_0}\cdot\frac{\ln(2\varphi x_0)}{\bar{t}}\right]^2 C_{vx}^2 + \left[\frac{D_{ln}(2\varphi\bar{x}_0)}{\varphi C\theta^2}\right]^2\cdot\left(\frac{\theta}{\bar{t}}\right)^2 C_{v\theta}^2}$$

and for the latter $C_{vt} = nC_{v\theta}$ and $C_{vT} = 0{,}5(0.5)(\alpha + 1)C_{v\theta}$ for $n = 0.5$. The coefficient of variation of total discharge of flood water on proceeding from the equation of water balance with the three fundamental terms in the right part of the equation (liquid precipitation, melt water and infiltration) is expressed by three equations for $r = 0$; $r = 0.5$; and $r = 1.0$; the first refers primarily to the northern, northeastern, western and northwestern parts of the European U.S.S.R., the second to the central and the third to the southern and southeastern parts of the European U.S.S.R. The coefficient of variation of total discharge of flood waters depends upon the coefficient of variation of flood water, upon the normal of the coefficient of flood water discharge, and upon the relationship of the coefficients of loss of infiltration and water yield. The coefficient of variation of discharges or of molecules of maximum discharge of flood waters is: $C_{vm} = \sqrt{(\alpha C_{vC})^2 + (\beta C_{vD})^2 + (\gamma C_{vP})^2}$ where C_{vC}, C_{vD}, and C_{vP} = coefficients of variation of melt water, rain water and losses (infiltration) during time: $\tau = t_2 - t_1$; α, β, and γ = ratio over a period of years of melt water, rain water and losses to the mean value of discharge. For computing the probability of the maximum discharges the formula $P = (Q_p - \bar{Q}(aC_v + 1)/\bar{Q}_bC_v)$ is derived. For actual calculation the equation $p = [(1.4\gamma n/t + v)]^x$ is proposed; x = exponent depending upon coefficient of variation and asymmetry of maximum discharge; it is equal to $1/0.7 + n$; n = parameter equal to $\rho(1 + lgC_v)$ where ρ = coefficient depending upon asymmetry coefficient; γ = total fraction of retention; and $(\tau + v)$ = total fraction of loss. *Subject Heading:* **1. Flood discharge forecasting.**—*I.L.D.*

12L–575 551.509.58:551.579.4

Darman, Z. I., **Predvychislenie pavodkov po kharakteristikam pritoka vody i vremeni dobeganiia.** [Predicting floods from characteristics of water influx and time of travel.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 50:40–55, **1957.** 5 figs., 3 tables, 7 refs., 23 eqs. **DLC**—The calculation and forecasting of floods is examined for conditions in which the influx of water into a river network from each unit area of the catchment basin is essentially uniform for the territory. The variation of the influx water from precipitation or snow melt into a river basin is analyzed on the form of individual waves each of which is expressed as a rectangle. To the unit wave of influx corresponds a unit flood and the absolute magnitudes of the discharges into a closed basin in a calendar period taking into account distribution of runoff in a unit flood is determined by: $Q_{T_0} + (n - 0.5)0.1t_{max} = \gamma Q_n^*$ (Q_n = runoff in fractions of total flood. $\gamma = (10\Sigma\gamma/t_{max})$ m^3/sec). The computation of a hydrograph by the method of analysis of the water influx into simple wave is illustrated. Various procedures for obtaining curves representing the time of travel of runoff are examined critically and a simplified procedure for obtaining curves of time of travel of runoff is presented and the distribution of catchment areas according to time of travel of runoff is analyzed. Finally, a method of forecasting spring floods on the basis of the relationships between the properties of influx of waves, curves of time of travel is outlined. *Subject Headings:* **1. Flood forecasting techniques 2. River hydrology.** —*I.L.D.*

12L–576 551.509.58:551.579(47

Gavrilov, A. M. and Kuznetsov, I. V., **Usloviia stoka v svoebraznom rechnom basseĭne primere odnoĭ vesny.** [Runoff conditions in a peculiar river basin during a sample spring perio *Vsesoiuznoe Geograficheskoe Obschestvo, Leningrad, Isvestiia,* 89(5):468–473, **1957.** 3 figs., tables, 5 refs. **DLC**—A detailed analysis of the hydrotropical processes involved in the format of spring floods in the basin of a single small river. While the force of the flood in the princi river is uniform, the flood is the result of different natural conditions of individual parts of basin of the particular river and the particular complex hydrological situation. The river exami is the Ordezh (a tributary of the Luga River, in Leningrad Region) in its upper course from source to the town of Vyritza, in the spring of 1955. A description of the river basin is giv The physical geography of this river and the location of hydroelectric stations and of measur stations is indicated. Data are given on the winter rainfall in various parts of the river. Wa reserves in the snow, mean monthly air temperature during March and April, and hydrographs rivers of the Ordezh River basin and graphs showing the relationship between maximum run amount and area of the catchment basin of the Ordezh River are presented. From the detai analysis of the above factors it is concluded that for small rivers whose basins comprise differ natural features, hydrological calculations and forecasts cannot be based upon a generalized met and upon zonal meteorological conditions but upon additional detailed data on the hydrolog conditions. *Subject Headings:* **1. Runoff distribution in river basins 2. Flood forecast 3. Spring floods 4. Ordezh River, Leningrad Region, U.S.S.R.**—*I.L.D.*

12L–577 551.509.58:551.579(282.2

Gurevich, M. I., **Prognozy letnogo i osennego stoka po gidrologicheskim i meteosin ticheskim faktoram (na priemere r. Kamy).** [Forecasting summer and autumn runoff f hydrological and meteorological-synoptic factors (The Kama River taken as an example).] *Len grad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy,* No. 75:14–62, **1960.** 10 figs., 7 tables, 7 refs., 8 eqs. Russian summary p. 62. **DWB**—The use of hydrological and syno meteorological methods in forecasting thirty days in advance the influx of water into the Ka River along the section of the Votkin Hydroelectric Station-Sokol Gory is examined. In the of hydrological forecasting which involves the use of precipitation as well as the water dischar of the basin it is shown that variants of the relationship $Q_t = f(W_t, X_t)$ underly the forecas procedure; (W_t = water supplies as in the basin at the moment t, X_t = precipitation correspon to the flow in the formation of supplements to W_t). The proposed method developed for forec ing inflow in this section during July–October involves the calculation of inflow for June by equation $Q_t = K_t \Sigma Q_t$ and for the remaining months $Q_1 = K_1 \Sigma Q_t + K_2 B\text{-}C$. The argum underlying the hydrological and hydrometeorological procedures, the validities of these met and calculations with these methods are discussed and illustrated with the aid of relevant equati numerical data and synoptic maps. *Subject Headings:* **1. Runoff forecasting 2. Hydrom orological procedures 3. Kama River, European U.S.S.R.**—*I.L.D.*

12L–578 551.509.58:551.5

Ishiwara, Kenji (*Central Met. Observ., Tokyo*), **Forecasting method of snow melt.** *searches on Snow and Ice, Tokyo,* No. 2:115–128, Jan. **1955.** 12 figs., 4 tables, 15 eqs. Japanese. **DWB**—Deposited snow starts to form when $80M + Q_5 > Q_1 + Q_2$ where M is m of new snow per cm² area. Q_5 is radiated heat from snow cover, Q_1 of solar radiation heat Q_2 of heat transferred to the snow-cover surface from the atmosphere. The ending date deposited snow can be predicted using the equation $80M = \Sigma Q_1$ and forecast of flood by snow is attempted using the equation $L = 5(t_{pr} + t_r/2)$ where L is base length (hr), t_{pr} is time from the time at the center of the curve of snow melt to the time at the peak runoff of hy graph, and t_r is snow melt period. *Subject Heading:* **1. Snow melt forecasting.**—*J. H. W*

12L–579 551.509.58:551.5

Kaczmarek, Zdzislaw, **Efficiency of the estimation of floods with a given return pe** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Tor Sept. 1957,* [*Proceedings*], Vol. 3, pub. **1958.** p. 144–159. 3 figs., 8 tables, 19 refs., 25 **DWB** (M(06) I611g)—A maximal annual stream flow with a given return period Q_{max} generally dependent on a certain number of parameters estimated in various ways from an element random sample. The value of Q_{max_T} is thus an estimate of the real flood recurring in T years in an infinite statistical population of maximal flows. In order to determine efficiency of the estimation the author works out asymptotic distributions of the estimate Q for the distribution function $F(Q_{max})$ defined by the Foster and Gumbel methods and the normal method. He introduces the notion of confidence intervals of the estimate, giving a rat basis for the determination of the safety factor, dependent on the required confidence coeffi

...e. The considered confidence interval on the flow $Q_{\max T}$ essentially differs from the control ...nterval used by GUMBEL, which interval characterized only the deviation of an individual m-th ...lement in an ordered N-year observation sequence. Numerical examples illustrate the application ...f the formulas deduced, permitting a comparison of the efficiency of the estimate $Q_{\max T}$ as de...ermined by different methods. *Subject Heading:* **1. Flood forecasting.**—*Author's abstract.*

12L–580 551.509.58:551.579.4(47)

Kalinin, G. P. and Makarova, T. T., **Prognoz vesennego polovod'ia.** [Forecasting spring ...loods.] *Moscow Tsentral'nyĭ Institut Prognozov, Trudy*, No. 84:43–52, **1959.** 3 figs., 4 tables, 12 ...efs., 3 eqs. **DWB**—The forecast and calculation of spring floods can be carried out on the basis of ...he relationship: $Q_{t+\Delta t} = f(y,T)$, where $Q_{t+\Delta t}$ = discharge of water during any constant interval of ...ime after the start of spring rise, y = expected volume of runoff, T = duration of inflow of principle ...nass of melt waters into the river network after the start of the spring rise of water level. The ...irst forecast may be constructed rapidly after the start of the spring high water on the basis of the ...orecast of runoff volume and snow melt intensity. When the melting of the principle mass of snow ...as ended the runoff volume can be calculated also from hydrological data (channel supply, inflow ...f water into the river network, flow of small rivers). In this case the calculated duration T can be ...omputed from the duration of the principle mass of water. Different waves of flood water must be ...onsidered separately in the case of interrupted thawing. The method proposed can be applied ...o forecasting and calculating rain floods. The value y is replaced by a corresponding volume of the ...lood examined and T = duration of effective precipitation after starting of the flood. The re...ationship $Q_{t+\Delta t} = f(y,T)$ can be obtained on the basis of curves of runoff time obtained from ...graphs $Q = f(y,T)$ when T is equal to the computed unit for extreme values of runoff volume. For ...his it is necessary to construct the relationship:

$$Q = f\left(Q_1 \frac{Q_1}{Q_2}\right),$$

...where Q = actual discharge, Q_1 and Q_2 = discharges from curves of runoff time for small and large ...runoff. Data on verified forecasts of spring runoff for Khover River-Besplemianovskii River, ...Kliaz'ma River, Kovrov River, etc., are presented. *Subject Headings:* **1. Spring flood forecasting ...2. U.S.S.R.**—*I.L.D.*

12L–581 551.509.58:551.579.4(584.6)

Kavetskiĭ, S. P., **Nekotorye itogi i perspektivy resheniia problemy prognoza, raschety i ...mer bor'by s katastroficheskimi pavodkami v gornykh raĭonakh.** [Certain results and per...spectives for the solution of the problem of forecasting and calculating catastrophic floods in ...nountain areas, and control measures.] *Vsesoiuznyĭ Gidrologicheskiĭ S"ezd, Trudy* (of 3rd ...Conference, Oct. 1957), Vol. 7, issued **1959.** p. 217–223. 3 figs. **DWB** (M79 V985tr)—In ...he mountains of Kazakhstan, Central Asia and other regions of the U.S.S.R., short and strong ...rainfalls cause catastrophic floods on small rivers with a catchment area of up to 100 sq km. ...Possibilities of forecasting such floods from maximum air temperatures and prevention of damage ...is discussed. Experiments were made with possibility of preventing strong rainfall by artificial ...smoke screens. Artificial flood waves indicate lesser transport velocities than those calculated by ...formulas. *Subject Headings:* **1. Flood forecasting 2. Kazakh S.S.R. 3. U.S.S.R.**—*J.N.*

12L–582 551.509.58:551.579.4(52)

Kawabata, Y. (*Japan Met. Agency, Tokyo*), **Meteorological services in Japan for flood ...warning and control.** *Geophysical Magazine*, Tokyo, 29(3):289–306, Aug. **1959.** 15 figs. (incl. ...photos), tables, 5 eqs. **DWB, DLC**—A report explaining the methods used by the Meteorological ...Services in Japan for flood warning and control. The network of automatic wireless rainfall ...reporters (1958) and the network of aerological stations in Japan are shown, as are the modern ...automatic and self recording devices. Two examples of flood warning and control systems are ...described—that on the Tone and on the Kitakami. A characteristic cyclone track over Japan is ...illustrated and described. The scheme for the observation, collection, and transmission of the ...data to the forecasting center is diagrammed. A surface weather map May 29, 1955, and isohyetal ...maps (with profiles) used in warning of imminent high water is included. Planning of reservoirs ...is also given consideration. *Subject Headings:* **1. Flood warning services 2. Japan.**—*E.Z.S.*

12L–583 551.509.58:551.579.4:532.52

Kinosita, Takeo, **Hydrodynamical study on the flood flow.** *International Association of ...Geodesy and Geophysics. Association of Scientific Hydrology, Publication*, No. 42:56–63, **1956?** ...6 figs., 2 tables, 3 eqs. **DWB.** Also reprinted as *Tokyo. Univ. Geophysical Institute, Geo-*

physical Notes, 10(1), 1957. Contribution No. 3. **DLC**—Hydrodynamical equations, equatio of motion and continuity, were solved numerically excluding only the terms of inertia and witho any other simplification. This method is very useful for flood forecasting and civil engineeri Some physical characteristics of the flood flow were found by this method. *Subject Heading* **1. Hydrodynamics 2. Flood forecasting.**—*Author's abstract.*

12L–584 551.509.58:551.5

Kohler, Max A. (*Chief Res. Hydrologist, U. S. W. B., Wash., D. C.*), **Preliminary rep on evaluating the utility of water supply forecasts.** *Western Snow Conference, Proceedin* Vol. 27, April 1959, pub. Sept. 1959. p. 26–33. 4 figs., 6 refs. **DWB**—A paper read at Western Snow Conference last year verified the water supply forecasts for the period 1946– The method of verification utilizes errors of individual forecasts expressed as percent of observed flow. Subtracting the flow to date from the water-year forecast magnifies the error telescoping it into a short period. The Soil Conservation Service forecasts for April have b slightly more accurate than those of the Weather Bureau. The survey for April constitutes independent measure of winter precipitation. Snow survey and precipitation data are comp mentary and both can be used to advantage. *Subject Heading:* **1. Water supply forecast utili tion.**—*A.H.K.*

12L–585 551.509.58:551.579.4:551.57

Komarov, V. D., **Voprosy teorii i rascheta (prognoza) snegovogo polovod'ia nebol'sh ravninnykh rek.** [Theory and computation (forecasting) of snow floods in small rivers in plain *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 50:3–39, 1957. 13 figs., 9 tables, 37 re 27 eqs. **DLC**—The contents of this comprehensive study include the following: the depend of snow cover deposition upon climate, relief and vegetation with particular reference to the o spaces and forest steppes of European U.S.S.R. and the distribution of water content of sn cover in open localities (with uneven relief) by the equation of asymetrical binomial curve, resu of observations and computations of the rate and area of snow melt for Oka and Vorona ba during the period 1947–1952, the water retention capacity of snow in relation to the problem the water yield of melting snow cover, the physical processes and law of the flow of water all slopes covered with snow, and the development of equations for computing the velocity of w at a given moment along a slope; the formation of large accumulations of melt water on surface of basins and the laws of the flow of such water; theoretical assumptions for calcula the flow of melt water to temporary streams and to rivers; a method for calculating and forecas water discharges during flood periods on the basis of data of snow melt; and the results of culations made with this method. *Subject Headings:* **1. Snow melt flood forecasting 2. Eu pean U.S.S.R.**—*I.L.D.*

12L–586 551.509.58:551.579.4(9

Kumra, P. N. (*Central Water and Power Commission, New Delhi*), **Place of flood forec ing in reducing damage by floods.** (In: Symposium on Meteorological and Hydrological Asp of Floods in India, New Delhi, April 1958, **Proceedings.** Delhi, Indian Meteorological D **1959.** p. 91–92.) **DWB** (M79.4 S989pr)—The place of flood forecasting in controlling the effects of floods is emphasized. The fundamental factors that have to be studied for develo techniques for formulating flood forecasts are briefly mentioned. The usefulness of flood f casts and their limitations have been pointed out. *Subject Headings:* **1. Flood forecasting Flood forecast utilization 3. Flood symposia 4. India.**—*Author's abstract.*

12L–587 551.509.58:551

Liu, Y. H., **Hydrometeorological observation and its forecasting.** *Meteorological Bull* Taipei, Formosa, 2(1):11–17, March **1956.** 3 tables. In Chinese. **DLC** (Orientalia)— nificance, necessity, and importance of hydrology and hydrometeorology were noted in a b sense, and in addition to the general observation, forecasting, and its effectiveness are discus Tables show amounts of rainfall and water in storage, in April of 1944. This report is densed from the **Handbook of Meteorology,** by Bollay, Beers and Beery (1945)—from Par and from Ch. II of the **Compendium of Meteorology** by Malone (1951). *Subject Head* **1. Hydrometeorological forecasting.**—*K.C.*

12L–588 551.509.58:551.579.4(

Lundberg, O. R., **Vozmozhnosti dolgosrochnogo fonovogo prognoza Leningrads navednenii.** [Possibilities of forecasting the background of Leningrad floods a long tim advance.] *Moscow. Gosudarstvennyĭ Okeanograficheskiĭ Institut, Trudy,* No. 37:53–58, 4 figs., table. Russian summary p. 58. **DWB**—The development of the methods for foreca

f Leningrad floods is based on consideration of the following problems: (1) forecasting of maxi-num rise of water level, (2) forecasting of duration of the flood and (3) sufficiently advanced orecasting of approaching flood. The changes in the water level at the estuary of the Neva iver are usually affected by changes in the level of the Baltic Sea. The latter is affected by est to east movement of large air masses or by atmospheric processes above the North Atlantic egion. Coincidence of these two processes leads to rapid rise of the water level to flood magni-ude in the Neva River. Statistical analysis of intensity and magnitude of previous floods is lustrated by the curves on recurrence of high floods correlated with the synoptic conditions. *ubject Headings:* **1. Flood forecasting 2. Synoptic conditions for floods 3. Leningrad, J.S.S.R.**—*N.P.S.*

12L–589 551.509.58:551.579.4:551.482.2(472)

*Makarevich, T. N. and Mytarev, N. M., **Vskrytie rek Severo-zapada SSSR i metodika go prognoza.** [River breakup in northwestern U.S.S.R. and its forecasting.] *Leningrad. osudarstvennyĭ Gidrologicheskiĭ Institut, Trudy,* No. 67:3–47, **1958.** 14 figs. (3 fold), 6 tables, charts, 19 refs. **DWB**—The study of climatic conditions in the northwestern part of the .S.S.R. and particularly of the regional distribution of temperatures, preceding the river break p, is described in detail, with aid of tabulated data, graphs and maps. The data from reports rom 1900 to 1957 are reviewed and classified for early, normal and late river openings, observed t different zones. Statistical average values are marked on the maps for each period. For the urpose of forecasting the whole territory is divided into six regions: Kola peninsula, northern nd southern Karelia, basins of the Sviz and Neva, Il'men-Volkhov basin and the basin of Lake hudskoe and the Gulf of Finland. Positive and negative deviations from average values are abulated for each region. The methods for long range forecasting on the basis of the above data re discussed in detail and correlated with the synoptic processes and atmospheric anomalies. The elations of timing of the river break up are graphically correlated with baric topography and ressure anomalies for each region. Different climatic and geographic condition and unstable eather condition affect the correct solution of the problem of long range forecasting; nevertheless, he subdivision of six regions and consideration of local thermal conditions of preceding winter re improving the accuracy of forecasting. The appendix contains ten pages of tabulated data n river break up at different localities, their coordinates, the timing and duration and deviation rom the statistical averages. *Subject Headings:* **1. River ice break up forecasting 2. Long ange forecasting 3. Northwestern U.S.S.R.**—*N.P.S.*

12L–590 551.509.58:551.571(47)

Nikitina, E. A., **Rezultaty ispytaniia metodiki prognoza izmeneniia udel'noĭ vlazhnosti od vliianiem podstilaiushcheĭ poverkhnosti.** [Results of tests of a method of forecasting ecific humidity changes under the influence of the layer near the ground surface.] *Moscow. entral'nyĭ Institut Prognozov, Trudy,* No. 83:13–21, **1959.** fig., 7 tables, ref. **DWB**—Varia-ons in humidity and temperature of air masses in summer over European U.S.S.R. during their ovements above the non-uniform layer near the ground are discussed on the basis of the pub-shed work of L. S. MININA. Additional increase in humidity of air due to movements from the y ground to moistened or wet ground are reported for the layers of 1.5 to 2.0 km above the round at various temperatures and with various differences above the dew point. The method f forecasting the humidity increase is described for 107 cases with various ground conditions nder moving air. The coordinated results are assembled in seven tables with an analysis in the xt. *Subject Headings:* **1. Specific humidity forecasting 2. European U.S.S.R.**—*N.P.S.*

12L–591 551.509.58:551.579.4(282.247)

Norvatov, A. M., Remizova, L. K. and Koroloeva, N. P., **Dolgosrochnyĭ fonovyĭ prognoz odnosti letneĭ mezheni rek lesostepnoĭ zony (na primere rek basseĭnov Volgi i Dona).** Long range back ground forecast of the volume of water during summer low water in rivers of he forest-steppe zone (the rivers of the Volga and Don basins taken as an example).] *Leningrad. osudarstvennyĭ Gidrologicheskiĭ Institut, Trudy,* No. 75:63–93, **1960.** 11 figs., 5 tables, 18 refs. ussian summary p. 93. **DWB**—The magnitude of the summer low water stream flow in the orest-steppe zone is influenced by a number of interacting factors such as the ground water upplies which depend upon variation of hydrometeorological conditions; the changing and dis-pation of fall and summer rainfall. Methods for forecasting summer low water stream flow on he basis of winter flow and meteorological synoptic conditions, the latter involving elementary ynoptic processes of VANGENGEĬM are developed for long range forecasting of summer low water ream flow for a large area. *Subject Headings:* **1. Long range forecasting 2. Summer stream ow forecasting.**—*I.L.D.*

12L–592 551.509.58:551.579:551.482.2(4

Norvatov, A. M., **Metodicheskie osnovy fonovogo dolgosrochnogo prognoza letnego m hennogo stoka rek lesostepnoĭ zony Evropeĭskoĭ territorii SSSR.** [Methodological princip for long range forecasting summer low water stream flow of rivers in the forest steppe zone European U.S.S.R.] *Leningrad. Gosudarstvennyĭ Gidrologicheskiĭ Institut, Trudy,* No. 67:8 96, **1958.** 12 figs., table, 24 refs. **DWB**—Duration of the low water period varies with zon geographic conditions and the longest period is usually observed in the forest-steppe zone, wh the river receives mainly the underground water. Various methods of forecasting of the sumn out flow are reviewed with attention to the following: 1) The use of inertia of the hydrologi phenomenon and extrapolation of the integral characteristics (outflow curves, variations in t water reserves in basin and the reserves in the river basins); 2) accounting for the connection hydrometeorological conditions in a preceding period with the magnitude of the summer outfl and 3) the use of regularities in the relationship between the river and underground wat Application of these methods were discussed in detail and with graphs for summer outflows major rivers (Volga, Dnieper, Don, Kama, etc.). Many graphs are given showing relation minimum outflow during winter, summer, autumn and spring and the coefficient of average wi and summer outflows, and their relation to other factors and interrelationships. *Subject He ings:* **1. Summer low water forecasts 2. River level forecasts 3. European U.S.S.R.**—*N.L*

12L–593 551.509.58:551.579.4:551.4

Ogievskaia, V. A., **Primenenie pokazateleĭ atmosfernoĭ tsirkuliatsii dlia prognozov vysshikh urovneĭ v zimnevesenniĭ period na rekakh Zakarpatskoĭ oblasti.** [Use of atm pheric circulation indices in forecasting the highest winter and spring water levels in Tr carpathian rivers.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Inst Trudy,* No. 15:73–83, **1958.** 3 figs., 6 tables, ref., eqs. **DLC**—The method of L. A. Vit for forecasting river runoff on the basis of pressure anomalies is applied to long range forecas of maximum flood levels on the Tisza, Vilok, Rika, etc., rivers in the Transcarpathian Region was found possible to distinguish 22 forecasting indications for the period March-December of preceding year. Forecasting indices for the maximum mean daily levels and levels at fixed d on the Tisza and Delovoe Rivers, graphs showing the relationship of maximum levels for va periods to forecasting indicators and curves of probabilities of errors, etc., are presented. proposed forecasting method is evaluated. *Subject Headings:* **1. Water level forecasting Long range flood forecasting 3. Transcarpathian Region, U.S.S.R.**—*I.L.D.*

12L–594 551.509.58:551.579.2:551.43

Parsons, Walter J. and Castle, Glenn H. (*U. S. Army, Corps. of Engineers, Sacram Dist., Calif.*), **Aerial reconnaissance of mountain snow fields for maintaining up-to-date casts of snowmelt runoff during the melt period.** *Western Snow Conference Proceedings,* 27, April 1959, pub. Sept. **1959.** p. 49–56. charts, table. **DWB**—With the rapid increas the need for water in the western states, the need for more accurate forecasting of snow melt off has increased. The widespread snowfield on high mountain basins can be considered as a wedge for forecast purposes. The differences in volume of runoff in different years is due t depth of the snow wedge. Since abnormal precipitation after April 1st can cause a chang snow index, it is desirable to correct the initial index value. A simple graphical method developed to forecast the remaining runoff based on aerial reconnaissance. The method acceptable results from May 15 to July 1st after which snow fields break into small detached *Subject Headings:* **1. Snow melt runoff forecasting 2. Western U. S.**—*A.H.K.*

12L–595 551.509.58:551.579.4

Parthasarathy, K. (*Met. Off., New Delhi*), **Flood forecasting and flood warning in I a general review of the problem.** In: Symposium on Meteorological and Hydrological as of Floods in India, New Delhi, April 1958, **Proceedings.** Delhi, Indian Meteorological **1959.** p. 93–98. fig., table.) **DWB** (M79.4 S989pr)—The importance and utility of flood casting as a flood control measure have been described and the various steps in the techniq computing flood forecasts are given in detail with illustrations from the flood forecasting pr in vogue in the U.S.A. The possibilities of evolving such techniques in India and starting a forecasting service have been reviewed. *Subject Headings:* **1. Flood forecasting servic Flood warning services 3. India**—*Author's abstract.*

12L–596 551.509.58:551

Podvishenskaia, N. Ia., **K voprosu o prognoze maksimal'nogo urovnia polovod'ia.** tribution to the problem of forecasting maximum flood level.] *Moscow. Tsentral'nyĭ I*

Prognozov, Trudy, No. 24(51):43–54, 1951. 7 figs., 4 tables, 6 refs., 3 eqs. **DWB**—The author discusses the method of corresponding levels of discharges used for short range forecasts of the height and time of passage of spring floods of large and small rivers, the virtual impossibility of using this method for small rivers, the use of the statistical relationship of discharge (level) with maximum water storage in a river and maximum mean air temperature during the period of flood water formation, together with a qualitative consideration of conditions of the surface of the basin (moisture state, depth of ground frozen) for forecasting maximum water level, and the method developed by G. P. KALININ (*Tsentral'nyĭ Inst. Prognozov, Trudy,* No. 4, 1947), which has the disadvantage that even for large basins with large lateral influx and dissected relief, the maximum total influx and maximum flood in the adjoining measuring basin occur almost simultaneously. The method of short range forecasting proposed by the author involves the direct determination of the maximum level of flood discharge on the basis of maximum yield of water to the basin from snow melting and computation of total flood hydrograph. This method was verified for three rivers of the basin of the Upper Don, namely: Bolshaia Sosna, Voronezh and Don Rivers. The equation for calculating the maximum yield of water, the results of actual computations of maximum yield, graphs showing the relationship of maximum yield, and time of its occurrence to time of maximum yield on the several river basins, the equation for computing the discharge of water in an adjacent basin, etc. are presented, and the results of computed and actual hydrographs are compared indicating the validity of the method proposed. *Subject Headings:* **1. Maximum flood level forecasting 2. Don River Basin, U.S.S.R.**—*I.L.D.*

12L–597 551.509.58:551.579.2(282.247.4)

Richards, H. B. (*Watermaster-Hydrographer, Truckee-Carson Irrigat. Dist., Reno, Nev.*), **Snow melt curve.** *Western Snow Conference, Proceedings,* Vol. 27, April 1959, pub. Sept. 1959. p. 21–26. 2 plates. **DWB**—One of the major problems in snow surveying is to measure it in terms of stream flow. The first work in snow surveys was started with Truckee-Carson drainage basins about 1910. The first attempt to evaluate it in terms of stream flow was done by taking certain groups of years as an average. In an attempt to set up another method of evaluating, certain basic postulates were set up as the yearly snow pattern; any year will present a constant ratio of snowfall, any year will fall above or below the mean etc. By using the historical references time and magnitude of the flow can be forecast. *Subject Heading:* **1. Snow melt forecasting.**—*A.H.K.*

12L–598 551.509.58:551.579.4(282.247)

Romanenkor, V. A., **Prognoz dat nastup leniia maksimal'nykh vesennikh urovnei na rekakh basseina Srednego i Nizhnego Dnepra.** [Forecasting the date of occurrence of maximum spring levels in the rivers of the Middle and Lower Dnieper basin.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 9:102–112, 1957. 8 figs., 6 tables, 4 refs., several eqs. **DWB**—The author presents a method for short range forecasting of the dates of maximum levels of spring flood developed for the Sula, Psel and Vorskla Rivers, etc., on the basis of dates of transition of atmospheric temperature through 0°C and on the basis of calculation of snow melt. As a result of the fact that in the basins investigated the mean daily air temperature passes through 0°C repeatedly the passage through 0° is considered accomplished when the mean daily air temperature continues positive for three or four days (depending upon the river basin). In order to increase the range of forecasts of the dates of maximum spring levels the forecasts must be issued on the day of transition of the temperature through 0° so that it is necessary to use the atmospheric temperature forecast for the immediate 2–3 days. More reliable forecasts are achieved by taking into consideration the process of snow melting. The relationship of dates of maximum levels to dates of disappearance of snow cover is shown to be a partial case of the relationship with dates when K (module coefficient of melting snow) attains assumed values; $(K = W_m/W_{max}) = (iEt/W_{max})$ where W_m = melting snow; W_{max} = snow amount at start of snow melting; i = coefficient of snow melt; Et = suma of positive maximum air temperatures during snow melt period. The assumed values are the dates of maximum water yield and dates of maximum supply to the basin. Equations for calculating water yield and water supply to the basin are developed. Nomograms for determining values of module coefficients of melting snow from the sum of positive maximum air temperature during the melting period and snow supply at start of snow melt, for determining the intensity of water supply in the basin from data on maximum snow supplies and sum of positive maximum air temperature during the snow melt period, etc., and graphs showing the relationship of dates of maximum river levels to dates of maximum water yield to K, etc., and data on the verification of operational forecasts are presented. *Subject Headings:* **1. River level forecasting 2. Dnieper River Basin, Ukrainian S.S.R.**—*I.L.D.*

12L–599 551.509.58:551.579.4:551.482.2(282.24

Rozova, A. P., **Metodika dolgosrochnogo prognoza stoka i maksimal'nogo raskh polovod'ia na rekakh basseĭna Verkhnei Bolgi.** [Method of long range forecasting runoff maximum flood discharge of rivers in the Upper Volga Basin.] *Moscow. Tsentral'nyĭ Ins Prognozov, Trudy,* No. 94:34–36,1959. **DWB**—The results of investigations of the possib of forecasting volume of runoff and maximum water discharge of spring floods on the V River up to Staritsa, the Tvertsa River up to Prutenok, the Mologa River up to Ustruzhna in the Chagodoshcha River up to Anisimovo are presented. The proposed method of forecas is based upon the empirical solution of the equation of water balance $y = x - p$ where $y =$ ru during the flood period, $x =$ quantity of water arriving at the surface of the basin during s melting, $p =$ magnitude of ton of melt water runoff. The runoff during the flood period, w content of the snow cover and precipitation during high water period were calculated from a date. Beginning and end of high water was determined from hydrographs. Rain floods occu during the time of high water were not eliminated. In calculating, the water content of the s cover at the beginning of melting of an ice crust on the soil surface is considered. The a amount of precipitation during snow melt is determined by the equation $\Sigma x_1(1-\gamma) + 0.7(\Sigma$ where Σx_1 and $\Sigma x_2 =$ amount of precipitation during snow melt in open locality and in fi respectively. $\gamma =$ forestation of the basin in fractions of one: 0.7 takes into account the rete of precipitation by the roof, the forest canopy. An account of the procedure for determinin loss of melt water on the basis of the fall moisture content of the soil and its depth of fre at the beginning of snow melt is given. Data on the determination of runoff amount with rections for depth of soil freezing, regression equations, total and partial correlation coeffi between the variables in the empirical equations and data on the reliability of verified forecas runoff amount etc. are presented. The forecasts can be made 30–40 days in advance. *Su Headings:* **1. Long range runoff forecasting 2. Flood discharge forecasting 3. Upper V Basin U.S.S.R.**—*I.L.D.*

12L–600 551.509.58:55

Sachs, Milton S. (*Hydraulic Engineer Bonneville Power Administration Portland, Ore* **Methods and procedures used in forecasting dependable inflow to Grand Coulee Pr Washington.** (In: Washington (State). College, **Proceedings of the WSC Hydraulics ference, Oct. 1957, Pullman, Wash.,** pub. 1957. p. 119–137. 16 figs., table). **DWB**– paper describes methods used in forecasting dependable inflow to Grand Coulee Dam, Washi which are similar to those used by the Bonneville Power Administration on the Columbia Federal Power System. Forecasting of inflow by the methods adopted here is considered dependable for hydrological purposes. A discussion is given on the ability to forecast depe resources in 1956–1957, in excess of the historical critical flows (1936–1937). It is the hydr situation that accounts for the improved results. The forecast increases are very signific appraising the power resources so vital to the Pacific Northwest. *Subject Headings:* **1. supply forecasting 2. Grand Coulee Dam, Wash.**—*N.N.*

12L–601 551.509.58:551.579.4:5

Sapozhnikov, V. I., **K metodike prognoza letnego stoka rek.** [Method of fore summer river discharge.] *Moscow. Tsentralnyĭ Institut Prognozov, Trudy,* No. 50:86–121 13 figs., 13 tables, 9 refs., 49 eqs. **DLC**—In order to forecast the volume of runoff at di intervals of time during the summer it is necessary to calculate the inflow of water from p tation into the river network, the time of travel of water to the closest collecting point principle elements of the computation are determination of the arrival of the water at the s of the catchment area, the loss of water during the flow on slopes, the arrival of water river network and the time of travel of water to closest collecting point. From the initi tribution of inflow from unit rain and time of travel of channel flow, it is possible to de the distribution of active areas which are then used to compute the volume of runoff. formulating a method of forecasting the runoff volume for any time interval (day, pentad, month) it is necessary to devise an approximate method for predicting the variation of dai off in the closed collecting point. Particularly important is the separation of the amount of to be forecast into two components, one of which is determined by the supply of water river network at the time of the forecast and other by the inflow of water into the network the period before the forecast. The equation for forecasting summer runoff for various in of time is of the form $\bar{Q}_{n+T} = aw_n + k_{1\eta}\bar{h}_2$ where $\bar{Q}_{n+T} =$ mean discharge of water for the elapsed period, $w =$ water supply, $k =$ coefficient of transition from layer of water in mil to discharge in m^3/sec, $\eta =$ coefficient of runoff, $\bar{h}_2 =$ mean precipitation in basin in m $a =$ parameter. The development of the equation for forecasting the hydrograph of rai

nd the total runoff volume is presented. The application of the runoff forecasting equation is llustrated for a series of rivers, namely with a forecast of daily runoff of the Medvenka River t Bol'shoe Sazeevo; a forecast of a ten-day mean of water discharge of the Moscow River at venigorod, etc. *Subject Headings:* **1. River discharge calculations 2. Runoff forecasting . U.S.S.R.**—*Author's conclusions and I.L.D.*

12L–602 551.501.5:551.48.018:551.509.58:551.579.4

†Sapozhnikov, V. I., **Ob ispol'zovanii krivykh dobeganiia vody dlia prognoza stoka.** [Use f hydrograph curves for forecasting discharge.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 84:54–64, **1959.** 3 figs., 2 refs., 14 eqs. **DWB**—The use of the hydrograph curves o compute and forecast runoff is analyzed with the aid of the formulae for the hydrograph curve f slope runoff. Hydrograph curves for calculating runoff along river channels including curves or calculating and forecasting runoff on sections of a channel for a basin part and on an entire asin etc. The fundamental curves applicable for the calculation of runoff are shown to be links n the general chain of calculations of the hydrographs for river basins. The curves reflect ndividual aspects of the process of water displacement along slopes of basins and channels of ivers. The distribution of slope runoff $S = f(\tau)$ can be used only to calculate total inflow of vater in a river network according to the arrival of water at the surface of the catchment basin. The hydrograph curve of channel flow for the basin $R = f_3(\tau)$ is necessary to calculate water ischarges at the river gage sections according to the total inflow into the river network. The ydrograph curve along the section $R = f_2(\tau)$ is necessary to calculate runoff in the lower gage rom data for the upper one. The discharge of water in the lower gage of the inflow section is xpressed in the form

$$Q_{H,t} = \sum_{i=t-\tau_{10}-\tau_n+1}^{t-\tau_0} r_i Q_{Bi} + \sum_{i=1}^{\tau_n} Riqi.$$

ubject Headings: **1. River discharge forecasting 2. Hydrograph curves 3. Runoff fore- asting.**—*I.L.D.*

12L–603 551.509.58:551.579.4(282.247.4)

Sapozhnikov, V. I., **Prognoz ob"ema stoka Volgi i Kamy na osnove ucheta zapasov vody v reke snegotaianiia v basseine.** [Forecasting the discharge volume of the Volga and Kama Rivers on the asis of water reserves in the river and snow melt in the basin.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 44(71):8–29, **1956.** 7 figs., 9 tables, 5 refs., 22 eqs. **DWB**—The forecasting f the amount of flow in a large river involves the calculation of $\bar{Q}_1$ (part of the flow due to the re- erves of water in the river network at the moment the forecast is issued) and forecasting Q_2 (the mount of flow from the arrival of water into the river network during the period in advance of the orecast) on the basis of meteorological data during the time preceding the forecast. A procedure or computing and forecasting Q_2 is presented. For a large basin with homogeneous physical geo- raphical conditions, covered with forest and having afforestation coefficient α, the magnitude of the ayer of melted snow expressed in water is given by

$$h = k_p \bar{t}_{\omega p}(1 - \alpha) + k_l \bar{t}_{\omega l} \alpha$$

where k_p and k_l = coefficients characterizing the layer of snow melting for one degree of positive ean daily temperature expressed as water per field and forest respectively; $\bar{t}$ = mean air temperature orresponding to field and forest. The total inflow of melt water into the river network is given by

$$q = k_1 \eta h$$

where $k_1 = \omega_0/86.4$ = conversion coefficient from layer of runoff in mm to discharges in M^3/sec for basin with area ω_0 in km^2, η-coefficient of flow. The derivation of a formula for computing and orecasting the elements of amount of flow for different intervals of time is presented and it has the orm

$$\bar{Q}_n t_T = aW_p + k_0 \bar{t}_{l2} e^{-c\Sigma \bar{t}_{l2}}$$

where W_p = water reserve in river network and

$$\bar{Q}_2 = k_0 \bar{t}_{l2} e^{-c\Sigma \bar{t}_{l2}}$$

k_0 = maximum value of conversion coefficient obtained empirically with the graph $k = f(\Sigma \bar{t}_{l2})$ when $\Sigma \bar{t}_{l2} = 0$, c = parameter. The application of this procedure to calculations of flow on the Volga at hboksar and the Kama River at Sokol'ikh Gor for various years is illustrated. *Subject Headings;* **. River forecasting 2. River discharge calculations 3. U.S.S.R.**—*I.L.D.*

12L–604 551.509.58:551.579:551.482.2(282.2

Sysoeva, M. P. and Ogievskaia, V. A., **O vozmozhnosti dolgosrochnogo prognoza naib shikh urovneĭ vesnoĭ na rekakh Zakarpat'ia.** [Possibility of long range forecasting of highest spring water levels in Transcarpathian rivers.] *Kiev, Ukraine. Nauchno-Issledova skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 15:84–93, **1958.** 4 figs., 2 tables, 3 refs. —The authors discuss the relationship between the physical geography of the Transcarpathian the hydrographic features of the region including the effect of the upper climate, the variatio precipitation with altitude, snow melt periods and directions of floods dependence of water su in the snow cover upon total summer precipitation, etc. In view of the available hydrom orological knowledge of the Transcarpathian region long range forecasts of maximum levels du the winter-spring periods can be based upon data of total precipitation in the basin and sur positive air temperatures. The influence of the latter must be taken into account either as introduction of a third variable or indirectly, i.e., by not considering the precipitations during warming period with the passage of floods on the river. The validity of long range forecas examined; they have errors ranging 10–20%. *Subject Headings:* **1. Long range water forecasting 2. Hydrography of Transcarpathian Region 3. Transcarpathian Region, U.S** —*I.L.D.*

12L–605 551.509.58:551.482.2:551.579.4(282.2

*†Szesztay, Karoly, **A duna vízjárásánk előrejelzése.** [River forecasting on the Hung Danube.] *Hungary. Vizgazdálkodási Tudományos Kutató Intézet, Tanulmányok és Eredmé* No. 6, **1959.** 102 p. 58 figs., 26 charts (fold. in pocket), 24 tables, 32 refs. **DWB, I** Also: Translation of the text, separately issued, entirely in English with t-p in Hungarian, lish, Russian and German. Issued Budapest, **1959.** 48 p. Mimeo. **DLC, DWB**—A discu on methods developed and used by the Research Institute for Water Resources, Budapest. divided into flood forecasting from precipitation data and from gage readings; continuous to day stage and discharge forecasting and finally low water forecasting for the gage of Or The methods are presented in connection with the aids developed to forecast the streamflow o Hungarian part of the Danube River. The methods applied have to be adapted to the indiv characteristics of any water system. Graphical elaborations of data represent the main too technical hydrological research. Hydrological experiments are performed where possib glass-canals in order to obtain the best insight into the phenomena. Glass canals are replac hydrological research by curves showing the change of events. The relations based on resu observations are best determined by graphical methods. The construction of three var graphs and summarizing them in a coaxial system was deemed practical in solving multi-va relations. Characterization of bed fullness is the clue to gage relation. The characterizati bed-fullness by actual water volume only is not practical because the flood is also influenc longitudinal water distribution in the basin. This factor also is expressed by three-va graphs. Precip. crest stage relations are applicable to forecast floods by index numbers of tively few pluviometers, even in the case of large water-system areas, the bed-fullness start of precip. being the main variant of the relations. The known rating curve of a few makes forecasting possible for intermediate gage stations. The profile of daily stage var can be used for constructing continuous day to day forecasts. The grouping of the sum volume is essentially different from that of the original work, being supplied with imp details of evaluation. However, an unabridged translation of the table of contents, the notations, the figure captions and the data within the tables is provided for the summary also. The appendix, including a guide for the use of the tools therein consists of a stati work map, of numerous diagrams and tables on the forecast of floods in general, and on water forecasting for Orsova. These features, supporting the detail problems of the eva part as well as the complementary remarks and explanations at the ends of the sections are tial for closer aquaintance and appreciation of the study of the forecast method. *Subject ings:* **1. Flood forecasting 2. Hungary.**—*O.T.*

12L–606 551.509.58:55

Tachalov, S. N., **Metodika prognoza ledovykh zatrudneniĭ na Shcherbakovskoĭ** [Method of forecasting ice hazard for the Shcherbakov Hydroelectric Station.] *Len Gosudarstvennyĭ Gidrologicheskiĭ, Trudy,* No. 66:75–91, **1957.** 7 figs., 8 tables, 8 refs. —The results of an investigation carried out by the Rybinsk Hydrometeorological Observa order to study the conditions under which underwater ice forms in the Sheksna extension Shcherbakov Hydroelectric Station and to develop a method for forecasting the ice hazards hydroelectric station during the fall-winter period. The properties of the hydrometeor regime of the Rybinsk water reservoir and of the Sheksna extension are analyzed and data surface area and mean depth of the water reservoir, on the date of beginning of ice for

duration of cooling of water from 4° to 0°C in the central pool of the Rybinsk water reservoir, data of ice formation in the Sheksna extension, etc. The hydrological and meteorological conditions including current velocity, water and atmospheric temperature and prevailing wave direction associated with the formation of underwater ice in the region of the Shcherbakov Hydroelectric Station are summarized. A method for forecasting the appearance of ice hazards 10–12 hours in advance is developed and its application is illustrated. *Subject Headings:* **1. Ice hazard forecasting 2. Hydrometeorological regime 3. Shcherbakov, Yaroslavl Region, U.S.S.R.**—*I.L.D.*

12L–607 551.509.58:551.579.4:551.482.2(479.22)

Tsomaia, V. SH., **K metodike prognoza vesennego polovod'ia na rekakh Gruzii v zavisimosti ot predshestvuiushchikh gidrometeorologicheskikh faktorov.** [Method of forecasting spring floods in Georgian rivers depending on the preceding hydrometeorological factors.] *Tiflis, Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut Trudy, Leningrad,* No. 4:168–171, **1959.** 2 figs., ref., 5 eqs. **DWB**—An attempt is made to determine the dependence of spring-summer runoff upon the factors of the preceding hydrometeorological regime. For the rivers of the Georgian S.S.R. the relationship

$$\frac{Q_{IV-VII}}{Q_{IX-XI}} > 1$$

holds when Q = runoff, the effect of water content of snow W, and of runoff Q upon K is given by

$$K = \frac{Q_{IV-VII}}{Q_{IX-XI}} = f(W, Q_{XII-III})$$

The dependence of K upon W for the Kara and Aragvi Rivers is illustrated by means of graphs and the deviation of individual points can be diminished by the correction

$$\Delta K = 1 - \frac{Q_{IX-XI}}{Q_{XII-III}}$$

The high accuracy of forecasts of spring summer runoff is important in forecasting maximum mean monthly runoff of floods by recording to the method $Q_{max} = f(Q_{IV-VIII})$ where Q_{max} = maximum mean monthly discharge of flood, and Q_{IV-VII} = amount of forecast spring summer runoff. *Subject Headings;* **1. Spring flood forecasting 2. Flood forecasting 3. Georgian S.S.R.**—*I.L.D.*

12L–608 551.509.59:551.579(73)

Vazhnov, A. N., **Prognozy stoka gornykh rek v S Sh. A.** [Forecasts of runoff of mountain rivers in the U.S.A.] *Meteorologiia i Gidrologiia,* No. 1:51–55, Jan. **1957.** 2 figs., 14 refs. **DWB, DLC**—A comprehensive review of studies on forecasting runoff and stream flow in mountain rivers in relation to rainfall and snow melt carried out in the United States during the past 20 yrs. The review discusses the work of H. L. Potts on snow surveys and runoff forecasting from panoramic photography, the use of radioactive cobalt in snow surveys in mountain regions, the long term precipitation-runoff relations established by M. Bernard and others, studies on heat balance of melting snow, etc. *Subject Headings:* **1. Runoff forecasting 2.Precipitation-runoff relationships 3. Cobalt traces 4. United States.**—*I.L.D.*

12L–609 551.509.58:551.579.1

†Wallner, J., **Hochwasservorhersage aus Niederschlägen am Obermain.** [Flood forecast based on precipitation data for the Upper Main.] *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], Vol. 3, pub. **1958.** p. 234–259. 14 figs., tables, 37 refs. English summary, p. 234 **DWB** (M(06) I611g)—The forecast time space, which is available when floods are forecasted from water stages, is at the headwater rivers not sufficient to inform the inhabitants of the valley in time. Therefore some years ago a flood forecast based on precipitations was arranged for the upper Main with a basin of 12000 km². It was a success and it seems to be applicable for the headwater of other rivers. The method consists in dividing the precipitation into periods of for instance 24 hours and in finding out the corresponding partial flood waves by means of unit graphs and recession curves. The influence of changeable factors as i.e. vegetation and soil moisture is to be determined at the beginning of the flood by evaluating the first partial flood wave. Subsequently the average areal precipitation for each day for the total basin is to be found from the rate of runoff for the subbasins which is available as base of the forecast and which contains the influence of the changeable factors as well. Based on these two parameters, the one containing the total effect of the runoff factors based on precipitation can now be performed. The various characteristic rainfalls of the basin and besides these the runoff from the frozen ground and from the snow melt can be

taken into account if this method is applied. *Subject Headings:* **1. Flood forecasting techniq 2. Flood forecasting from rainfall data 3. Main River, Germany.**—*Author's abstract.*

Ice Forecasting (551.509.58)

12L–610 551.509.58:551.5

Mori, S., **Forecasting of icing condition.** *Journal of Meteorological Research,* Tokyo, 8(443–449, Aug. **1956.** 4 figs., table, 21 eqs. In Japanese. **DWB, DLC**—The phenomenon of i condition does not necessarily occur in humid air in which fog and cloud related to over-coo water exist. The correct forecasting, therefore, requires a sublimation curve derived from temperature and dewpoint temperature when the water evaporation curve is to be drawn in emagram. The author, by using a differential equation, determined both sublimation and ev ration curves in considering two problems, namely: in the cast of the transformation of wa evaporation ↔ water, and of water-evaporation ↔ ice (both are related to temperature and p sure, using Clapeyron method). Next, there is a comparison of the relation between air perature, dew point temperature, and sublimation conditions. A diagram of saturated mi ratio in relation to water surface and to ice surface is shown. Lastly, through the emag division was made on the basis of the result of aerological observation on the relation of sat tion, over-saturation, and non-saturation to water and ice surface for the humid air in atmosphere. The classification of cloud, ice condition, and elasticity in each division was st by the Godeske method. *Subject Heading:* **1. Ice forecasting**—*K.C.*

12L–611 551.509.58:551.326.7(2

Palosuo, Erkki (*Inst. of Marine Res., Helsinki, Finland*), **Methods used in the ice se in the Baltic.** *National Research Council, Wash., D. C., Publication,* No. 598:239–243, **1958.** 2 figs., 11 refs. **DLC, DWB** (551.311 A675pr)—Present day methods used in the E ice service are: 1) the prediction of the moment of initial freezing in a certain sea area upon energy exchange considerations and 2) the growth and diminution of the area covered, dicted by statistical means. The two methods are described and different approaches adopte scientists to improve them examined. The statistical meteorological method of Jurva on w the actual work of the prediction is based, has been given special attention. A graphical illu tion of the "normal ice stages" in the Archipelago Sea deduced by Jurva and a diagram depi the ice winter are presented. *Subject Headings:* **1. Sea ice formation forecasting 2. Se reporting services 3. Baltic Sea.**—*I.S.*

12L–612 551.509.58:551.

Sawada, T. (*Hakodate Marine Obs.*), **A practical method for forecasting ice-area m ment.** *Meteorological Society of Japan, Tokyo, Journal,* Ser. 2, 36(1):32–39, Feb. **1958.** 7 2 tables, 6 refs., 2 eqs. **DWB, DLC**—The forces which cause ice to move are provided by stresses and water currents. In the present study the relationships between the movement c surface occupied by comparatively thin ice-floes mostly in contact (so-called close ice-area) the surface layer current and surface wind velocity are discussed at first and then a simpl easy method for forecasting the ice-area movement are presented using these relation Finally, the utility of this forecasting method is tested by applying it to actual examples o coast of East-Hokkaido on Feb. 1955 *Subject Headings:* **1. Ice movement forecastin Hokkaido, Japan.**—*Author's abstract.*

Phenological Forecasting (551.509.58)

12L–613 551.509.58:551.586:633.51(

Babushkin, L. N., **Otsenka vliianiia pogody na skorost' razvitiia khlopchatnika i met sostavleniia agrometeorologicheskikh informatsiĭ i prognozov nastupleniia osnobnyk razvitiia ego v ulsoviiakh Uzbekistana.** [Evaluation of the weather influence on the v of development of cotton and methods of obtaining agrometeorological information and forec the beginning of main phases of its development under conditions in Uzbekistan.] (In: M Tsentral'nyĭ Institut Prognozov, **Sbornik metodicheskikh ukazanii po analizu . . . agr orologicheskikh uslovii.** Leningrad, Gidrometeoizdat, **1957.** p. 226–260. 14 figs., 6 tab refs.) **DLC** (S600.M72)—The basic effects of the agrometeorological and phenological con on the growth, blooming and ripening of cotton, alfalfa and sunflower are discussed in deta tabulated data of observations and charts with graphic relation of the velocity of grow agrometeorological factors are included. The discussion concerns mainly the effects of moisture and heat. The light effect is considered not only from the view point of solar rad cloudiness, etc., but also from density of seeding, affecting its own shadowing. In considera moisture effects, attention is given to moisture reserves in soil, degree of precip. and co irrigation. The heat effect is related to sum of effective temp. and its distribution during

periods of development from seeding to appearance of mass sprouting—to stemming—to blooming, and to ripening. The results are analyzed and graphically correlated in terms of average rate (velocity) of growth and average temp. for various phases of growth. The forecasting of basic phases are described in relation to probable temp. conditions based on the data, accumulated during many preceding years and tabulated for each vegetation period. *Subject Headings:* **1. Phenological forecasting 2. Cotton climate 3. Alfalfa climate 4. Sunflower climate 5. Uzbek S.S.R.**—*N.P.S.*

12L–614 551.509.58:551.586:633.11

Mastinskaia, S. B., **Metodika sostavleniia agrometeorologicheskogo prognoza srokiv i norm poliva iarovoĭ pshenitsy.** [Method of composing agrometeorological forecasts of the timing and rate of watering for summer wheat.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metodicheskikh ukazanii po analizu . . . agrometeorologicheskikh uslovii.** Leningrad, Gidrometeoizdat, **1957.** p. 83–92. 3 figs., 4 tables.) **DLC** (S600.M72)—High and stable harvest of agricultural crops in arid region depends greatly upon the rational organization of irrigation in addition to occasional precip. and moisture content in the soil. Maximum effect of irrigation is discussed in detail and in respect to the timing and rate of watering and many other practical factors. Among these factors the first consideration is given to the crop type, period of vegetation and the difference in the rates of dissipation of available moisture and the rates required for normal growth of the crops during the same period. The method of computation of available moisture in the soil is described in reference to the vegetative period and forecast elements of the weather conditions. Consideration is also given to the tabulated data and graphs on expected precipitation and moisture reserves in soil. Composition of the table for forecasting of the timing and rate of watering for 5 day intervals for whole vegetative periods is described in the text and illustrated by two sample tables (preliminary estimation and corrected for actual conditions). *Subject Headings:* **1. Phenological forecasting 2. Summer wheat.**—*N.P.S.*

12L–615 551.509.58:551.524:551.579.5:633.63(477)

Mikhaĭlova, N. I. and Timoshenko, G. L., **K metodike prognoza srokovseva sadharnoĭ svekly.** [Method of forecasting the dates of sowing of sugar beet.] *Kiev, Ukraine. Nauchno-Issledovatel'skiĭ Gidrometeorologicheskiĭ Institut, Trudy,* No. 16:41–53, **1959.** 5 figs., 4 tables, 7 refs. **DWB**—Objective agrometeorological indices for determining the dates for sowing sugar beets in the Ukraine are developed. The active temp. for the germination of sugar beet seeds under field conditions in a mean daily temp. of 8°C. The transition of temp. through 8°C depends upon the date of temp. transition through 5°C. The sowing of sugar beets can begin with the establishment of the 5°C temp., since after the transition through 5° the transition through 8° occurs usually in less than 10 days. Average long period data indicate that in the Ukraine (except the Chernigov and Sumskaia Regions the maturity of clay soils is observed 1–5 days earlier than the transition of air temp. through 5° and 10–15 days earlier than the transition through 8°. The maturity of sandy soil is on the average 3–10 days earlier than on clay soil and 2–4 days earlier than on light clay chernozem than on heavy clay chernozem. The Ukraine can be divided into 5 groups of oblasts on the basis of temperature and moisture requirements in the sugar beet region. These are as follows: 1) Steppe Oblasts—3rd pentad of April; 2) Central and Eastern Forest Steppe—4th pentad of April; 3) Western Forest Steppe—5th pentad of April—4) Western Poles'e —5th and 6th pentads of April and 5) Eastern Poles'e—6th pentad of April. *Subject Headings:* **1. Agrometeorological indices 2. Sugar beets 3. Sowing date forecasting 4. Ukrainian S.S.R.**—*Author's conclusions & I.L.D.*

12L–616 551.509.58:551.586:633.11/4

Petunin, I. M., **Metodika sostavleniia prognoza usloviĭ perezimovki ozimoĭ pshenitsy i rzhi.** [Method of forecasting wintering conditions for winter wheat and rye.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metodicheskikh ukazanii po analizu . . . agrometeorologicheskikh uslovii.** Leningrad, Gidrometeoizdat, **1957.** p. 105–129. fig., 3 tables, 5 charts, 21 refs.) **DLC** (S600.M72)—Partial damage or complete destruction of the winter crops and forecasting of unfavorable conditions are discussed on the basis of the study of preceding season. The causes for these actions may be related to: freezing, ice covering, rotting, wetting, pushing out of soil by swelling, appearance of fungus and seeds blowing out of the soil. Each cause is discussed separately with description of possible conditions, their prevention and after effects. Considerable attention is given to the effect of freezing temperature, moisture content in soil and thickness of the snow cover. Various critical temperatures are given in tables. In preparation of the forecasts for winter considerations should be given to: special biological characteristics of winter crops, seeding time, date of initiation of various phases of developments of seeds, depth characteristics in soil, laboratory analysis of progressed development of seeds, accumulation of the

glucose (sugar) and other factors, accounted in the text. The appendix contains the table (1 pages) for temp. variation with depth of snow cover and corrections for average density of snc during previous decades and other data. *Subject Headings:* **1. Phenological forecasting Winter wheat crops 3. Rye crops.**—*N.P.S.*

12L–617 551.509.58:551.586:635.

Pobetova, T. A., **Metodika prognoza agrometeorologicheskikh usloviĭ razvitiia i srok sozrevaniia tomatov.** [Method of forecasting agrometeorological conditions of the developme and ripening of tomatoes.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metod cheskikh ukazaniĭ po analizu . . . agrometeorologicheskikh uslovii.** Leningrad, Gidromet oizdat, **1957.** p. 223–225. fig., table, 5 refs., 3 eqs.) **DLC** (S600.M72)—Air temp. and su of all temperatures, essential for growth and ripening of tomatoes are the basic factors subject to analysis in the discussion of the method for forecasting of the agrometeorological condition The effect of these factors is expressed with three equations and illustrated with three grapl *Subject Headings:* **1. Phenological forecasting 2. Tomato plants 3. Agrometeorologic forecasting.**—*N.P.S.*

12L–618 551.509.58:551.586:633.4

*Popovskaia, O. M., **Metodika otsenki agrometeorologicheskikh usloviĭ proizrastan kartofelia v tsentral'nykh oblastiakh Evropeĭskoĭ territorii SSSR.** [Method for evaluati agrometeorological conditions for the growth of potatoes in the central regions of the Europe U.S.S.R.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metodicheskikh ukaza po analizu—agrometeorologicheskikh uslovii.** Leningrad, Gidrometeoizdat, **1957.** p. 175–1 2 figs., 19 tables, 15 refs.) **DLC** (S600.M72)—Thermal conditions for beginning of the grow of potatoes are discussed in respect to observation data. The basic meteorological factors termining the speed of development of the potatoes are the soil and air temperatures, which sho be above 7°C and below 42°C. These factors are studied in the 60 hydrometeorological statio of the central region of the U.S.S.R. and the results are discussed in the text and accompanied numerous tables showing distribution of total average daily temperatures for difference int phasial period of growth with and without special fertilizers. Factual agrometeorological con tions are evaluated in respect to increased growth and phenological characteristics (sprouti blooming and fading of leaves). The evaluation data are tabulated in respect to three deca of each month (July–September) and for each interphasial period. *Subject Headings:* **Phenological forecasting 2. Potato climatology.**—*N.P.S.*

12L–619 551.509.58:551.50

Shigolev, A. A., **Metodika sostavleniia fenologicheskikh prognozov.** [Method of mak phenological forecasts.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metodich kikh ukazanii po analizu . . . agrometeorologicheskikh uslovii.** Leningrad, Gidrometeoizd **1957.** p. 5–18. 4 tables, 5 refs.) **DLC** (S600.M72)—Practical application of these methods agriculture was initiated more than a quarter century ago. The phenological process is based pre-calculation of the timing for initiation of various phases of development or growth of ag cultural crops. The timing depends upon preceding variation of temperatures and meteorologi conditions in general. Therefore, the phenological and meteorological forecasts are interrelat Theoretical approach and mathematical formulation of relations between these processes described in detail with consideration of average daily temperature above (accidental) minim temperature 5°C. The phenological processes are statistically timed within certain general me orological conditions, different for various localities and specific types of crops. Practical appli tion of these forecasts are discussed for the following agricultural products: winter rye, win wheat, summer wheat, oat and barley, flax, seeded grass and fruits. The basic phenological fo casts, after verification, are plotted on the regional maps and supplemented by the tabulated da Periodical analysis of the forecasts is corrected with reference to daily temperatures affect the interphasial developments (growth) of the crops. With systematic observation and anal of previous meteorological conditions the intermediate processes of growth can be forecast w better accuracy. *Subject Headings:* **1. Phenological forecasting 2. Agrometeorological fo casting.**—*N.P.S.*

Soil Moisture Forecasting (551.509.58)

12L–620 551.509.58:551.5

Burke, Hubert D. (*U. S. Forest Serv., Vicksburg, Miss.*) and Turnbull, Willard J. (*U. Army Engineer Waterways Experiment Station, Vicksburg, Miss.*), **Prediction of soil moist from soil and weather records.** *International Union of Geodesy and Geophysics. Associa of Scientific Hydrology, Publication* No. 48:69–75, **1959.** 3 figs., table, ref. French and Eng

summaries p. 69. **DWB**—As part of a study to develop means of estimating the ability of soils to permit vehicular traffic, a method was developed for predicting the moisture content of soils. Data used in development of the method were obtained from daily soil moisture and weather records kept for periods of one to two years at 131 sites throughout the United States. Chief influences on moisture accretion in the surface foot of soil were found to be the amount of rainfall and the amount of space available in the soil for water storage. Moisture depletion rates varied with the moisture content of the soil but followed characteristic curves for each season. The prediction method was tested on more than 600 sites throughout the United States. Results indicate that this empirical method can be used to predict soil-moisture content of sites for which the following are known: accretion and depletion characteristics, minimum size storm that will add moisture to the soil, field maximum and minimum moisture contents, and amount of rainfall during the period covered by the prediction. For well-drained sites, the prediction error was less than 0.3 inch of water per 6 inches of soil. *Subject Heading:* **1. Soil moisture forecasting 2. United States.**—*Authors' summary.*

12L–621 551.509.58:551.579.5:633.491

Mastinskaia, S. B., **Sostavlenie prognoza zapasov produktivnoĭ vlagi v pochve pod kartofelem i mnogoletnimi travami.** [Forecasting the reserves in productive soil moisture under potatoes and perennial grasses.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metodicheskikh ukazanii po analizu . . . agrometeorologicheskikh uslovii.** Leningrad Gidrometeoizdat, **1957.** p. 196–210. 7 figs., 11 tables.) **DLC** (S600.M72)—The methods of preparation of forecasts of moisture reserves in soils are described and tabulated data given on moisture reserves in different soils, their distribution with reference to the roots, months and precip. during decade. The description of these methods is applied separately for: potatoes, alfalfa and red clover. The total precip. is given in charts for decades and with reference to productive moisture reserves in the soil at beginning of the decade. *Subject Headings:* **1. Soil moisture forecasting 2. Phenological forecasting 3. Potato plants 4. Perennial grass.**—*N.P.S.*

12L–622 551.509.58:551.579.5

Razumova, L. A., **Metodika sostavleniia prognoza zapasov produktivnoĭ vlagi v pochve k nachalu vegetatsionnogo perioda.** [Method of forecasting productive soil moisture reserves for the beginning of the vegetative period.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metodicheskikh ukazanii po analizu . . . agrometeorologicheskikh uslovii.** Leningrad, Gidrometeoizdat, **1957.** p. 19–27. fig., 2 tables, ref.) **DLC** (S600.M72)—The soil moisture reserves in spring vary considerably from year to year and moreover the water reserve often is about the same as the amount precipitated during the entire vegetative period. Therefore forecasting soil moisture content is important, especially in dry regions. The moisture content in soil during winter depends upon underground movement of water and penetration of thawed water. Variation of water reserves during cold season, due to different causes, is discussed with reference to geographic location, and local topographic relief and illustrated with tabulated data. The method of preparation of the forecast of moisture reserves in soil depends upon many little known factors, such as: depth of underground water, depth of frozen soil, water penetrability in frozen ground, character of thawing, runoff thawed water, intensity of soil drying, etc. In view of the difficulties in the formulation of regular relations between these factors, the author prefers to establish the statistical relation based on known or observed factors. This method is discussed in detail with numerical and graphic illustrations for different parts of the European territory of the U.S.S.R. *Subject Headings:* **1. Soil moisture forecasting 2. European U.S.S.R.**—*N.P.S.*

12L–623 551.509.58:551.579.5:633.1

*Verigo, S. A., **Metodika sostavleniia prognoza zapasov produktivnoĭ vlagi v pochve i otsenka vlagoobespechennosti zernovykh kul'tur.** [Method of forecasting the reserves of productive moisture in the soil and evaluation of the moisture available to grain crops.] (In: Moscow. Tsentral'nyĭ Institut Prognozov, **Sbornik metodicheskikh ukazanii po analizu . . . agrometeorologicheskik uslovii.** Leningrad, Gidrometeoizdat, 1957. p. 143–164. 11 figs., 10 tables,) **DLC** (S600.M72)—The dynamics of the productive moisture reserves are determined with meteorological, biological, soil and other factors, which are discussed in the text and supplemented with tabulated data and eleven sets of graphs. Considerations are given to four processes of moisture variation in the soil: 1) type of watering, (high ground water, capilar wetting, capilar saturation and losses on evaporation and transpiration); 2) type of capilar wetting; 3) type of complete spring moistening and 4) type of saturated soils. Forecasting of productive reserves is made with the graphical analysis of multi-years surveying data on the moisture reserves in a given point or in similar ground with estimated corrections in view of expected meteorological changes. The use of empirical equations is given only approximate solution due to limited con-

sideration of all influencing factors. The discussion is accompanied by samples on computation of the expected productive moisture in soil on the basis of tabulated observation data. The preparation of the agrometeorological forecasts is made with consideration of the phase conditions of the grain crop vegetation periods. The yielding capacity is analyzed in respect to the moisture of crops, moisture reserves in soil (on various depths) and other factors. *Subject Headings:* **1. Soil moisture forecasting 2. Agrometeorological forecasting 3. Grain crops.**—*N.P.S.*

Miscellaneous (551.509.58)

12L–624 551.509.58:551.312.2:551.4

Bogdanovskaia-Gienef, I. D., **Prognozirovanie vsplyvannia torfa na zatoplennykh bolotakh** [Forecasting the emergence of peat in flooded swamps.] *Vsesoiuznyĭ Gidrologicheskiĭ S"ezd, Trudy* [Proceedings of the 3rd All Union Hydrological Conference Oct. 1957], Vol. 4, issue **1959.** p. 66–73. 2 figs., 5 refs. **DWB** (M79 V985tr)—The emergence of peat in swamps c cause damage to navigation. It is either caused by freezing of the peat, by its saturation by gas or by both. Conditions of formation of both are discussed and swamps are classified in order permit forecasting as to in which part and when the peat will rise. *Subject Headings:* **1. Pe emergence in swamps. 2. Swamp condition forecasting.**—*J.N.*

12L–625 551.509.58:632.1

Hendrick, Paul F., Jr., **Brief historical summary of Fire Weather District No. 8, Hea quarters Asheville, N. C. issued 1947.** 4 p. Mimeo. **DWB** (M(09) U587br)—Service w begun in the winter of 1932/3 and forecasts first issued from the Asheville Weather Bure office in the spring of 1933 for a limited area of the S. Appalachians. In 1947, 76 separate f organizations received special fire-weather forecasts for fire prevention and control in 7 sou eastern states. Danger periods normally comprise Feb. 15–May 15, and Oct. 15–Dec. 15, may be extended or shortened according to seasonal conditions. Daily forecasts cover clo weather, temperature, minimum relative humidity, wind direction and speed and any other fac of importance. Four-day outlooks for temp. and precip. are also issued. *Subject Headin* **1. Fire weather forecasts 2. History of Asheville fire weather service 3. Asheville, N. 4. Southern Appalachians, United States**—*M.R.*

12L–626 551.509.58:551.52

Iida, T., **On the prediction of the surface water temperature off Sakai and Cape Kyō** *Journal of Meteorological Research,* Tokyo, 10(10):879–881, Oct. **1958.** fig., 5 tables, eqs. Japanese. **DWB, DLC**—This article reports on an investigation of three factors: the predict for a month of the surface water temperature, effect of air temperature on water temperature, the characteristics of the sea area, using the data obtained by the Maitsuru Marine Observat during the period from 1952–56. The statistical values shown in tables are based on the follow formula: $Y = a + b_1X_1 + b_2X_2$ where Y = surface water temperature by presuming sea area (X_1 = water temperature from A area to B area in consideration with a continuity of water t perature and its running current, X_2 = monthly mean value by prediction. The results are ta lated with the conclusion that: 1) for one month's prediction the effect of air temperature the continuity of water temperature are approximately the same; 2) the influence of windl prediction was not much effective; 3) the formula was very fair on the calculation between area of Sakai and Cape Kyōga. *Subject Headings:* **1. Surface water temperature forecast 2. Forecast evaluation 3. Sakai, Japan 4. Cape Kyōga, Japan.**—*K.C.*

12L–627 551.509.58:551.509.317.551.51

§Romanova, L. A., **Proverka pravila o napravlenii peremeshcheniia tsiklonov u po khnosti zemli.** [Verification of the rule on the direction of cyclone movement near the gro surface.] *Moscow. Tsentral'nyĭ Institut Prognozov, Trudy,* No. 83:45–47, **1959.** 4 tables, **DWB**—According to N. G. Leonov's rule, the cyclone trajectory near the ground at the in moment deviates to the right from the isohypse surface of 700 mb (or 500 mb), passing abov center. Later this deviation is reduced and the cyclone trajectory crosses the isohypse and it deviates to the left. The trajectory passes the isohypse approximately after 24–36 hours. other words the cyclone center near ground surface after 24–36 hours must be near the isoh passing above the center at the initial time. The verification of this rule is carried out in Division of Short Range Weather Forecasts of The Central Institute of Forecasts with the of 1955–57. One-hundred cases of the cyclone movements are studied, among which 47 occurred during the winter, 15 during summer and 38 in spring. Ring and synoptic maps the maps of the baric topography at 700 and 500 mb are used in the verification process. results are assembled in 4 tables with indications of the number of cases and percent of the These results were discussed in the text. *Subject Headings:* **1. Cyclone trajectories 2. F casting cyclone trajectories 3. Forecast verification 4. U.S.S.R.**—*N.P.S.*

12L–628 551.509.58:551.524.36(522.21)

Shiga, M., **Forecasting of maximum temperature at Kumamoto.** *Journal of Meteorological Research,* Tokyo, 8(3):170–171, March **1956.** fig., table, 2 refs., eq. In Japanese. **DWB, DLC**—This investigation was made for the purpose of studying early forecasting of maximum air temperature in the mid-summer. Contrary to H. Riehl's method the author has attempted to obtain the maximum temperature from the data based on observations of upper-air-layer. Using an adiabatic chart on 900 mb at 12 o'clock in Kagojima the temperature is measured along the dry adiabatic curve at 3 o'clock in Kumamoto taking into consideration the air pressure and humidity in it. However, this method can be applied only in the stabilized climate surrounded by *mT* air mass. *Subject Headings:* **1. Temperature forecasting 2. Maximum temperature forecasting 3. Kumamoto, Japan.**—*K.C.*

12L–629 551.509.58:551.547.1

U. S. Air Weather Service, **Forecasting altimeter settings.** Its *AWSM Manual,* 105–54, Sept. 1, **1960.** 33 p. 14 figs., tables, 9 eqs. **DWB**—This manual describes methods of converting a forecast sea-level pressure to a forecast altimeter setting. Four methods differing in their input data requirements and their conditions of applicability are presented. The first, method which is easier to use, gives acceptable accuracy at most stations below 1000 ft elevation. The second method is for use at stations above 1000 ft. The third method has been developed for use when concurrent values of sea level pressure and altimeter setting are not available. The fourth method enables the forecaster to convert a forecast altimeter setting at one station to a forecast altimeter setting at a nearby station. An appendix gives step-by-step procedures for each method and another gives a theoretical discussion of the basis for the methods. *Subject Heading:* **1. Altimeter setting forecasting.**—*A.H.K.*

Other Forecasts (551.509.59)

See also: **Hydrological forecasting** (Makarevich), 12L–410.

12L–630 525.6:551.509.59

Coulmy, Geneviève, **Analyse et prédiction des marées.** [Analysis and prediction of tides.] *Académie des Sciences, Paris, Comptes Rendus,* 246(13):1960–1963, March 31, **1958.** 4 refs. **DLC**—The knowledge of the amplitudes (Ai) and of the phases of (αi) of the various fundamental waves gives the analysis of the tide at the considered spot and allows the prediction of the tide at this same spot. The author's new method of forecasting consists of extracting, one after the other, the different waves which compose the tide, with their own amplitude Ai and phase αi, eliminating all others. This elimination is done through linear combinations of ordinates, the definition of which coincides with that of H and Y according to Labrouste's method. *Subject Heading:* **1. Tide forecasting.**—*A.V.*

12L–631 551.509.59:551.501.822:551.524.7

Gordon, S. M., **O vozmozhnosti ispol'zovaniia temperaturnykh dannykh radiozondirovaniia dlia tselei gidrologicheskikh raschteov i prognozov.** [Possibility of using radiosonde temperature data for hydrological computations and forecasts.] *Meteorologiia i Gidrologiia,* Leningrad, No. 9:32–34, Sept. **1958.** 2 figs. **DWB, DLC**—The author compared for each day of 1952 and 1953 the height of the +5°C isotherm, determined at Stalinabad by means of a radiosonde, with the vertical temperature gradient computed as 0.64° per 100 m. In the spring months the +5°C isotherm as given by the radiosonde is situated higher than the computed values. This is explained by the underlying surface; with the disappearance of snow at the station situated at a height of 3583 m, differences in the height of the +5°C isotherm were not evident. In order to verify the correctness of the temperature gradient obtained at Stalinabad the vertical temperature gradient in the free atmosphere between 1 and 4 km was determined by means of radiosondes. A value of 0.62°C per 100 m was obtained. In the absence of mountain stations the vertical temperature gradient can be computed from radiosonde data. The reliability of the computed temperature gradients during the snow melt period is indicated by the relationship between mean decadal air temperature from the gradient of 0.64/100 m and of the radiosondes at Stalinabad for the altitudes 1000, 2000 and 3000 m. *Subject Headings:* **1. Vertical temperature gradient 2. Hydrological forecasts 3. Stalinabad, Tadzhik Region, S.S.R.**—*I.L.D.*

12L–632 551.509.59:551.510.62:621.396.1(266)

Nason, Martin E., **Forecasting radio propagation conditions at the North Pacific radio warning service.** *Conference on Arctic Radio Wave Propagation, Alaska Univ., Jan. 1956, Papers.* Issued May **1956.** p. 24–30. **DWB**—In the last 15 years much work has been done in connection with prediction of characteristics of various layers of ionosphere but short-time variations are still difficult to predict. Five years ago, a group called "North Pacific Radio Warning

Service" was established in Alaska to issue forecasts of radio propagation conditions in the are
The forecasts issued by the group are based on the 27-day recurrence tendency of geomagnet
and ionospheric phenomena, sun earth relationships and the current quality of radio propagatio
Subject Headings: **1. Radio propagation conditions forecasting 2. North Pacific.**—*A.H.*

12L–633 551.509.59:551.326.85:628

Piotrovich, V. V., **Metodika dolgosrochnogo prognoza srokov ochischeniia oto l'da vod khranilishch Stalingradskoĭ Volzhskoĭ i Tsimilanskoi GES.** [Method of long-range forecastin the disappearance of ice from reservoirs of the Stalin, Volga, and Tsimlyansk hydroelectric pow stations.] *Moscow. Tsentral'nykĭ Institut Prognozov, Trudy,* No. 84–114, **1959.** 6 figs., tables, 10 refs. eq. **DWB**—A brief description is given of a method of calculation for determ ning annual dates of disappearance of ice from the reservoirs; also the results of verifications the method are presented. The dates of ice disappearance determined for the period 1925–19 were computed according to the method of heat balance by comparison of the maximum "supply cold" at the beginning of spring in the snow-ice cover and of the total magnitude of advection heat to it: $L\Delta M = \Sigma(\sigma_0 - \sigma_r + \sigma_k + \sigma_{ec})\Delta\tau$. The left term gives the variation of supply of co on the snow-ice cover expressed as a derivative of heat of fusion (L) with respect to the mass melting ice in a column 1 cm². The right part of the equation gives the total effect of the mo important elements of heat exchange of 1 cm² surface of ice cover during the time $\Delta\tau$, whe σ_0 = absorption of solar radiation by ice; σ_r = effective radiation, σ_k = convective heat exchan between ice cover and air, and σ_{ec} = heat exchange due to evaporation-condensation. The co putation of the elements of the heat balance equation is outlined and the results of application of th method determining the dates of disappearance of ice from the reservoir of Volga Hydroelectr Station, Stalingrad reservoir and Tsimlyansk reservoir and comparative data on dates of actu disappearance of ice from the Volga and in rivers under natural conditions are presented. T difference between computed and actual dates of disappearance of ice did not exceed ± 3 days, b existing long period data on the disappearance of ice from the Volga River could not be used extend the computed rivers of date to earlier year since the relationship between computed dat of ice disappearance in the reservoirs and the actual dates in the rivers has a reliability of abo 80%. The relationship between anomalies of mean monthly atmospheric temperatures for Mar in the case of the Volga Hydroelectric Station and Stalingrad reservoir and for February in t case of the Tsimlyansk reservoir and dates of disappearance of ice was established. The ter perature anomaly of the beginning of spring (March) owing to the inertia of the thermal regi of the atmosphere in the same season in the basin of the Middle and Lower Volga, is associat with temperature anomalies of the second spring month (April) when the principle melting of i takes place in Volga reservoirs. The atmospheric temperature anomaly at the beginning of spri serves as a definite characteristic of maximum thickness of ice before the start of melting. A cordingly the atmospheric temperature anomaly of the first month of spring can be used as a for casting indicator of dates of initiation of such an inertial process as the melting of the ice cov on the lake reservoirs. *Subject Headings:* **1. Long range forecasting 2. Reservoirs ice bre up 3. U.S.S.R.**—*I.L.D.*

ARTIFICIAL ACTION ON THE WEATHER AND CLIMATE (551.509.6)

12L–634 551.509.612:551.586:58

Artificial climate station for plant research. *Current Science,* Bangalore, 28(6):235–2 June **1959. DWB, DLC**—A brief description of the facilities and activities of an "Artific Climate Station" at the Institute of Plant Physiology in Moscow. Climatic conditions simulati those in various parts of the earth during the different seasons are set up for testing pla physiological response. Tests of frost-resisting ability, and best planting time are among tho reported here. *Subject Headings:* **1. Artificial climate stations 2. Climate control 3. Fro resistance of plants 4. Moscow, U.S.S.R.**—*E.Z.S.*

12L–635 551.509.9:551.58

Davitaia, F. F., **Napravlennoe izmenenie klimata antropogennymi faktorami.** [Direct man-made climate changes.] (In: Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, **Voprc Geografii.** Moscow, **1956.** p. 161–169. fig., 23 refs.) **DWB, DLC** (G58.G35)—The eff tiveness of directed man-made climatic changes achieved by way of affecting the active (soil) lay is discussed. The author reviews the theoretical justifications and the practical results of applyi various methods of meliorative exertion upon the active soil surface, such as irrigation, draina deforestation, reforestation and planting of forest belts, systems of soil tilling which bring chan in the soil surface and make it possible to adjust and mold the climate of the soil and of t lowest air layer. *Subject Headings:* **1. Climate control 2. Artificial climates 3. Soil clim tology.**—*A.M.P.*

12L–636 551.509.9:551.510.42:342(756)

Rogers, Samuel M. and Edelman, Sidney (*Public Health Service, Wash., D. C.*), **A digest of State air pollution laws.** *U. S. Public Health Service, Publication,* No. 711, **1959.** 117 p. **DNLM**—A compilation of laws pertaining to investigation of sources and ways of preventing, controlling, and eliminating air pollution in each of the fifty states of the U. S. The statutes are identified and given without comment or discussion. *Subject Headings:* **1. Air pollution control 2. United States.**—*E.Z.S.*

12L–637 551.509.612

Aichele, Heinz, **Frostschadenbekämpfung durch Lufttrübung.** [Frost damage prevention by inducing air turbidity.] *Germany. Deutscher Wetterdienst, Mitteilungen* 3(16):69–76, **1956.** 7 figs. (incl. photos). **DWB**—The author discusses some of the technical and physical presuppositions of frost prevention, methods of inducing air turbidity by the use of smoke, fog, and the economy and effectiveness of these methods. Photographs and diagrams illustrate the apparatus. *Subject Heading:* **1. Frost damage prevention.**—*I.L.D.*

12L–638 551.509.612:632.111.3

Härle, Albert, **Stellungnahmen der Pflanzenschutzämter zu aktuellen Problemen der Frostabwehr (Kurzprotokoll).** [The position of plant protection bureaus on current problems of frost prevention (brief account).] *Germany. Deutscher Wetterdienst, Mitteilungen,* 3(16): 24–25,**1956.** 13 refs. **DWB**—A summary of the altitude of the plant protection bureaus throughout West Germany regarding their problem of frost prevention. Suggestions were made that temperature associated with economically significant frost damage to various crops be determined, the methods of frost protection be surveyed and further research on frost prevention be carried out. Various proposals on the role of the weather service in frost prevention, the use of sprinkling, etc. are summarized. *Subject Headings:* **1. Frost prevention 2. Frost protection 3. West Germany**—*I.L.D.*

12L–639 551.509.612:631.548

Kidder, E. H. (*Mich. State Univ. East Lansing*), **Frost control by sprinkler irrigation.** (In: Ontario Irrigation Conference, Ontario Agricultural College, Guelph, Feb. 1956, **Proceedings,** pub. April **1956.** p. 9–13.)—Up to four times more yield can be expected by sprinkler irrigation as frost protection. The latent heat released during freezing is effective except during intense cold winds. At 20°F a minimum of 1/8 to 1/10 in./hr has to be supplied. It is necessary to follow the weather forecasts and to adjust them to the local microclimatic conditions by temperature observations. *Subject Headings:* **1. Frost protection 2. Sprinkling.**—*A.A.*

12L–640 551.509.612:634

Nagano, Japan. Weather Station, **On experiment of prevention against frost damage by heavy-oil-burning in apple-garden.** *Journal of Agricultural Meteorology,* Tokyo, 12(2):57–60, Oct. **1956.** 3 figs., 3 tables, 3 refs. In Japanese, English summary p. 60. **DWB**—Experiments for prevention against frost damage by "heavy-oil-burning" in apple orchards were carried out at Suzaka in Nagano Prefecture on the nights of April 20–21 and May 13–14, 1955. The area of the experimental field was about 36 × 33 sq m and oil-burning continued from 3:02 a.m. to 5:00 a.m. on May 14, 1955. The results obtained are as follows: 1) before burning, the inversion level was formed at a height of 2 m; 2) during burning, the inversion level rose to a height of 2.5 m. approximately, and the temperature rise was 3.9°C in the layer below the inversion level in 1 hr after firing, 1.5°C at the inversion level in 1.5 hr after firing and 2.4°C in the layer above inversion in 1¾ hr after firing and 3) the maximum value on the horizontal distribution curve of temperature was 3.5°C at the height of 1.5 m at the center of the field, in 1 hr after firing. The warm air region was transferred from the west part to the center of the field and then returned westward conversely. *Subject Headings:* **1. Frost protection of orchards 2. Apple orchards 3. Nagano Prefecture, Japan.**—*Author's abstract.*

12L–641 551.509.612:631.43

Slater, C. H. W. and Ruxton, J. P., **The effect of soil compaction on incidence of frost.** *Commonwealth Bureau of Horticulture and Plantation Crops, East Malling, England, Annual Report, 1954*:88–91. 4 tables, 4 refs.—On plots at East Malling minimum temperature 1″ above cultivated and rammed soil was 1–2°F higher on radiation nights than above loose soil, and about the same as above uncultivated soil. By a height of 2 ft difference disappeared. Temperature at 4″ and 8″ in loose soil was slightly higher than in rammed soil. *Subject Headings:* **1. Frost prevention 2. Soil conductivity 3. East Malling, Eng.**—*C.E.P.B.*

12L–642 551.524.371:551.509.612:632

Sherouse, Ray T. (*meteorologist*), **Notes on the use of vulcanol as preservative for you tree banks.** *Federal-State Warning Service, Lakeland, Fla., Weather Forecasting Mimeo* 59– April 24, 1959. 2 p. **DWB**—This is a product which when sprayed over the smoothed dirt ban mixes with the soil to form a tough coating or crust in the top layer of the bank. It is meant preserve dirt banks which ensure freeze protection to citrus trees. Vulcanol was used by seve growers in the Orlando district during 1958–59 season. This paper reports the results for th different groves which were examined several times during the season for the aging effects of crust covered banks. The vulcanol treatment at all three places was found to be effective. T paper also gives instructions for its use and an estimation of cost to treat each bank. *Subj Headings:* **1. Frost protection 2. Frost damage to citrus orchards 3. Orlando, Fla.**—*I.S.*

12L–643 551.524.371:551.509.612:631.67:621.64

Sherouse, Ray T. (*meteorologist*), **Some notes on frost protection by sprinkler irrigati** *Federal-State Warning Service, Lakeland, Fla., Weather Forecasting Mimeo* 59-12, April 24, 19 2 p. **DWB**—A short report of the effects of sprinkler irrigation upon frost protection, stud during the 1958–59 winter season at an Apopka citrus nursery located in very rolling country northwestern Orange County, near the Plymouth area. The cold nights of the season are enum ated, and the corresponding temperatures and durations are tabulated. The nights when sprinklers were operated are reported and leaf damage examined. During cold nights the sprii lers continued to operate until all the ice had melted from the ferns or else when the temperat rose again to 34°. It is concluded that the method is effective to protect citrus nursery sto provided the plants are pliable enough to bend without breakage. *Subject Headings:* **1. Fr damage to citrus orchards 2. Frost protection 3. Orange County, Fla.**—*I.S.*

12L–644 551.509.

van Eimern, Josef, **Frostschutz mittels Ventilation.** [Frost protection by means of fan *Germany. Deutscher Wetterdienst, Mitteilungen,* 3(16): 77–85, **1956.** 4 figs. (incl. photos), refs. **DWB**—A brief account is given of the atmospheric conditions near the ground associa with the occurrence of frost and the role of air mixing in frost prevention is considered. author then discusses the principles of frost protection by means of ventilators, the construct and operation of American wind machines, the results of experiments with wind machines England, Australia and in Germany. *Subject Headings:* **1. Frost protection 2. Frost f 3. Wind machines.**—*I.L.D.*

12L–645 551.509.615:629

FIDO—versus Po Valley Fogs. *Interavia,* Geneva, 9(4):233, **1954.** photo. **DWB**—C of FIDO is $5,000 per landing when petroleum is used, but where natural gas is available, as the Po Valley, it is much cheaper. DALMAR of Milan used methane in 6 burners at an Ital military airfield, dispersing fogs up to 800 ft. thick in 1 min at 1/3 cost. *Subject Headin* **1. FIDO 2. Fog dispersal 3. Po Valley, Italy.**—*M.R.*

WEATHER LORE (551.509.8)

See also: **How you can predict weather** (Rubin), 12L–482.

12L–646 551.509.8:551.593

Balk, J. G., **Observations of haloes.** *Weather,* 8(4):128, April **1953. DWB**—Of haloes seen at Oxford 1951 through 1952, 67% were followed by precip. within 24 hrs and 7 within 48 hrs. Likelihood is independent of intensity of halo. *Subject Headings:* **1. Halo servations 2. Weather lore.**—*C.E.P.B.*

12L–647 551.5

Béres, András, **Népi időjóslási adatok a Tiszántúlról.** [Weather lore of East Hunga *Időjárás,* 57(1):60–62, Jan./Feb. **1953. DLC**—Over 200 popular weather maxims collected eastern Hungary are listed without comments. The list is presented in a subject arrange with indication of the region in which the maxim is in use. *Subject Headings:* **1. Weather 2. Hungary.**—*G.T.*

12L–648 551.5

Bidault-de-l'Isle, Georges, **Les dictions météorologiques de la Chandeleur.** [Meteorolog sayings in connection with Candlemas Day.] *L'Astronomie,* Paris, 67:235–240, June 1953. D —These are excerpts from his **Vieux Dictons de nos Campagnes.** Issued Paris, Nouvelles

tions de la Toison D'Or, 1952. 2 v. **DLC**—A list of some 30 French weather proverbs going as far back as to the 16th century. *Subject Headings:* **1. Weather lore 2. France.**—*A.A.*

12L–649 551.509.8

Breland, Osmond P. (*Texas Univ. Dept. of Zoology*), **Groundhog—alleged weather prophet.** *Science Digest,* Chicago 33(2):81–83, Feb. 1953. **DWB**—A popular article, mainly about the habits of the ground hog which is purported to fortell the weather for six weeks after Feb 2 according to whether or not he sees his shadow. It is said to be a carry over to America from the European legend about the "hydgehof," which is not found in America. The ground hog, however, does not emerge in many parts of America until early March, and any way does not pay the least attention to his shadow and so the matter is not even of sufficient importance to warrant scientific verification. Furthermore, very few people really believe it, though everyone knows about ground-hog day. *Subject Headings:* **1. Weather lore 2. Ground-hog day.**—*M.R.*

12L–650 551.509.8

Chechowski, Włodzimierz, **O wykorzystanie ludowych przepowiefni klimatologicznych.** [On the utilization of popular climatological predictions.] *Gazeta Observatora PIHM,* 4(9):11–13, Sept. 1951. **DLC**—General considerations on the veracity and applicability of popular climatological sayings and weather prediction are presented and discussed. It is stressed that all of them are the manifestations of keen popular observation, that they pertain to specific areas, have originated at a definite time and can therefore not be applied in every point of the country and in all cases. *Subject Headings:* **1. Weather lore 2. Weather forecasting**—*A.M.P.*

12L–651 551.509.8(030.8)

Chu, Ping-hai, **T'ien ch'i yen yü.** [Weather proverbs.] Peking, *Kai ming shu tien,* 1952. 114 p. 11 figs., tables. In Chinese. **DLC**—Collection of weather proverbs. Ch. 1. On winds, 2. On cloud and fog, 3. On state of the sky, 4. On air temperature (warm and cold), 5. On rain, snow, dew, and hoar frost, 6. On thunder and thunderstorm, 7. On season and astrological prediction, 8. On phenology. Concludes with weather glossary. *Subject Headings:* **1. Weather proverbs 2. Glossaries.**—*H. Arakawa.*

12L–652 551.509.8:638.1

Deans, A. S. C., **Animal weather prophets.** *Weather,* 7(5):154, May 1952. **DWB**—Phenology and weather lore of bees. *Subject Headings:* **1. Weather lore 2. Animals.**—*C.E.P.B.*

12L–653 551.509.8:551.521.31

Georgi, J., **Die Sonne sticht. . . .** [The sun bites. . . .] *Meteorologische Rundschau,* Berlin, 8(7/8):135, July/Aug. 1955. **DLC**—L. Schulz (*Ibid.,* 8:67, 1955.) refers the "biting sun" to short periods of exceptionally high global radiation. These are not recorded by the Moll-Gorczyński solarimeter and Georgi prefers to apply the term to periods of excess radiation lasting several hours. *Subject Headings:* **1. Solar radiation 2. Weather lore.**—*C.E.P.B.*

12L–654 551.509.8(04)

Hanzlík, Stanislav, **O lidových povětrnostních pranostikách.** [On popular weather maxims.] *Meteorologické Zprávy,* 4(5–6):120–122, 1950. **DWB**—It is pointed out that weather maxims originated from observations made by farmers and other outdoor people. Author suggests that weather maxims be collected and classified from an historic point of view and arranged according to their meteorological value. Attention is given to dates and figures in maxims and to the necessity of correcting dates on account of changes in the calendar made by Pope Gregorius. Numerous maxims are quoted. *Subject Headings:* **1. Weather lore 2. Proverbs and maxims.**—*G.T.*

12L–655 551.509.8:551.509.54

Hoffmeister, Johannes, **Über die Siebenschläferregel.** [On the seven sleepers rule.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte* No. 42:256–258, 1952. table. **DWB**—Seven sleepers' day is June 27. Rainfall of each pental June 25–Aug. 18 is tabulated for 80 years at 4 stations in NW Germany and no general relation to June 25–29 found. *Subject Headings:* **1. Weather lore 2. Seven sleepers.**—*C.E.P.B.*

12L–656 551.509.8(87)

Permyn, L. A. S., **Weather signs in Virgil.** An attempt to discover something of the poet's working method by close examination of two passages in Georgics I and the sources on which they are based. *Oxford, Greece and Rome,* 20:26–37, 49–59, 1951.—Discusses the Greek and Roman

sources of Virgil's signs, with quotations, and their reliability. *Subject Headings:* **1. Weath lore 2. Virgil.**—*C.E.P.B.*

12L–657 551.509.8(0

Karapiperis, Photios P., **The tower of the Winds.** *Weatherwise,* 4(5):112–113, Oct. 19 2 figs. **DWB**—A description of the tower of the winds at Athens. Drawings of the bas-rel figures which represent the various winds prevailing in Athens are given and described in det *Subject Headings:* **1. Tower of the Winds 2. Weather lore 3. Athens, Greece.**—*I.L.D.*

12L–658 551.50

Katona, Imre, **Népi idő- és termésjóslás Csongrádon.** [Popular weather and crop pred tion in Csongrád.] *Időjárás,* Budapest, 55(3/4):81–90, March/April **1951. DLC**—In this tensive study of weather lore in the csongrád region (SE Hungary) popular belief concerni various phenomena as indicators of forthcoming weather development is reviewed. The mate is grouped under the following headings: human sensations and behavior, animals, insects a other small animals, birds, poultry, larger domestic animals, plants, singular days (several these are listed for every month of the year), planets, clouds, wind and miscellaneous sig Many of the maxims are believed to be capable of standing scientific judgment, but no attempt made to separate these from the ones derived from distorted tradition or superstition. *Subj Headings:* **1. Weather lore 2. Singularities 3. Hungary.**—*G.T.*

12L–659 551.50

Komárek, Julius, **Předvídají zvířata zimu?** [Do animals foresee winter?] *Meteorologi Zprávy,* 4(5/6):120–122, **1950.** In Czech. **DWB**—Answering the question, whether any c clusions can be drawn from the behavior of birds and animals as to how severe a winter will the author denies any such indices and supports his statements by facts from his own experien This reprint is taken from the book **Rozmanitost přírody** [Diverstiy in nature] published Prague in 1945. *Subject Headings:* **1. Weather lore 2. Severe winters.**—*G.T.*

12L–660 551.50

Krichak, O. G., **Mozhno li predskazat' pogodu letom po kharakteru zimy?** [Is it po ble to predict the weather in summer on the basis of the character of the winter?] *Prir* Moscow, 43(8):127–128, Aug. **1954. DLC**—This is the answer of an official of the Cen Institute of Forecasting to a question asked by a peasant of the Poltava region if it is true t rain falls 125 days after the first appearance of hoar frost in winter. After having pointed the difference between hoar frost, white frost and frost mist and the mode of their formati the author states that some statisticians can confirm, to a certain degree, the existence of a tain relationship between seasons; however, this relationship is not simple and scientific investi tions do not yet make it possible to make general faultless forecasts; it is much more diffi to give a timetable of the weather several months in advance and especially on the grounds such elements as hoar frost. *Subject Headings:* **1. Weather lore 2. Weather forecasting** *A.M.P.*

12L–661 551.509.8(

Miller, James E., **Socrates and the weathermen.** *Weather,* London, 7(3):78–82, Ma **1952. DWB**—Amusing Socratic dialogue satirizing weather forecasting. *Subject Headin* **1. Weather forecasting 2. Popular meteorology.**—*C.E.P.B.*

12L–662 551.509.8(0

Morris, Alex, **The man who guesses right.** *Saturday Evening Post,* Philadelphia, 227(2 48–49, 113–119, Nov. 10, **1954.** photos. **DLC**—Popular article describing activities of R SAGENDORPH who publishes the Old Farmer's Almanac at Dublin, N. H. *Subject Headin* **1. Weather lore 2. Almanacs.**—*M.R.*

12L–663 551.509.8(0

Neifert, William W., **Government weather forecasts versus fake forecasts and almana** *The Pennsylvania-German,* Lititz, Pa., 12(3):138–148, March **1911.** illus. **DWB**—Amer almanacs of the 17th and 18th centuries are reviewed and some of their ill-founded weather f casts quoted and rejected with scornful criticism. A few details are reported concerning establishment of Mount Washington Observatory a few years before this article was writ Equipment and methods used at the observatory are described and illustrated. Some other m orological projects are mentioned. *Subject Headings:* **1. Weather forecasting 2. Wea lore 3. Almanacs.**—*G.T.*

12L–664 551.509.8:551.577(453)

*Polli, Silvio, **Controllo statistico di un proverbio sulla pioggia.** [Statistical control of a proverb on rain.] *Trieste. Instituto Geofisico, Pubblicazioni,* No. 223, **1948.** 10 p. tables, 3 refs. **DLC**—The proverb that rain on Ascension Day would be followed by 40 days of rain was tested by means of 100 years of rainfall data at Trieste and 33 years at Udine, Treviso and Venice, and it was found that the proverb did not hold water. Neither the quantity of rain nor the number of rainy days following Ascension Day showed any significant relation to that on Ascension Day. For a given city and period there is some evidence of a favorable correlation, but this is nullified by data for other places or periods. *Subject Headings:* **1. Weather lore 2. Statistical tests of weather proverbs 3. Rainfall correlations 4. Trieste 5. Venice, Italy.**—*M.R.*

12L–665 551.509.8

Roberts, I. C., **Welsh weather lore.** *Weather,* 6(11):328–330, Nov., **1951. DWB**—A number of proverbs and sayings (general, months, seasons, animals and birds). *Subject Heading:* **1. Weather lore.**—*C.E.P.B.*

12L–666 551.509.8:551.593.63

Roth, Günter D., **Observations of halos.** *Weather,* 7(8):248–250, Aug. **1952.** table. **DWB**—At Munich in 1951 halo phenomena were recorded on 44 days. Of these 72% were followed by precip. within 48 hrs. *Subject Headings:* **1. Halo observations 2. Weather lore.**—*C.E.P.B.*

12L–667 551.509.8:529.5

Schindler, G., **Wie was das damals mit der Kalender-Reform?** [How was it with calendar reform?] *Wetterlotse,* No. 60:175–176, Aug. **1953. DWB**—Note on change from Julian to Gregorian Calendar and its effect on relations of weather to Saints' Days. *Subject Headings:* **1. Calendar reform 2. Weather lore.**—*C.E.P.B.*

12L–668 551.509.8:551.583.13

Smith, L. P., **Seasons: good and bad.** *Agriculture,* London, 62(9):438–440, Dec. **1955. DA**—Seasonal prognostics in Inwards' **Weather Lore** are checked against London weather 1840–1949. The only one which is supported by statistics is that a wet autumn indicates a cold and early winter. *Subject Heading:* **1. Weather lore.**—*C.E.P.B.*

12L–669 551.509.8

Smith, L. P., **Weather wisdom.** *Agriculture,* London, 61(4):185–188, July **1954. DA**—Popular article on weather proverbs and Saints' Days. Many "rules" are useless, but some cloud warnings and crop proverbs have a sound basis. *Subject Heading:* **1. Weather lore.**—*C.E.P.B.*

12L–670 551.509.8

Spencer, R. E. (*U. S. Weather Bureau*), **Weather seers mix balderdash, fact.** *Cotton Gin and Oil Mill Press,* Dallas, Texas, 56(2):20, Jan. 15, **1955. DWB**—Contradictions which occur in weather proverbs are humorously pointed out. *Subject Heading:* **1. Weather proverbs.**—*M.R.*

12L–671 551.509.8:551.578.46

Taguchi, T., **Weather folk-lore on snow.** *Seppyo* (Snow and Ice), Tokyo, 12(3):271–272, **1950.** tables. **DWB**—Two weather folk-lore rules on snow in Japan are statistically tested. *Subject Headings:* **1. Weather lore 2. Snow**—*H. Arakawa.*

12L–672 551.509.8

Whiten, A. J., **'Bunions and seaweed.'** *Weather,* 10(6):183–190, June **1955. DWB**—A comparison is made between forecasts of a team of weather wiseacres (sailors, farmers, rheumatic sufferers etc.) organized by a Sunday newspaper and the official forecasts of the Meteorological Office. The former averaged 61% correct compared with 81% for the latter. *Subject Heading:* **1. Weather lore.**—*C.E.P.B.*

12L–673 551.509.8

Wood, Charles Aubrey, **Deep and crisp and even.** *Weather,* London, 7(12):359–367, Dec. **1952. DWB**—Blank verse fantasy on forecasting on Christmas Day. *Subject Headings:* **1. Weather forecasting 2. Poetry.**—*C.E.P.B.*

OTHER QUESTIONS RELATING TO WEATHER FORECASTING AND ARTIFICIAL ACTION ON THE WEATHER (551.509.9)

12L–674 551.509.9:551.578

Hopkins, Walt (*Ch., Div. Watershed Manag. Res., Pac. SW Forest and Range Expt. S USDA, Berkeley*), **Snow management research in the Sierra Nevada: a review and a lo ahead.** *Western Snow Conference, Proceedings,* 27:75–78, April 1959, pub. **1959.** 19 re **DWB**—Contribution of JAMES E. CHURCH in connection with snow conservation which he e phasizes the importance of trees in relation to snow conservation. According to him the id conservation forest is one, where sun rays cannot reach the snow. He perfected his snow t and system of snow surveying. Last year at the Central Sierra Snow Laboratory near Don Summit, 7000 snow measurements in various forest and forest openings were made. *Subj Headings:* **1. Snow management research 2. Forest influences on snow conservation Sierra Nevada, United States.**—*A.H.K.*

12L–675 551.509.9:551.510.42(7

***Severe smog returns [to California] in 1958.** *Clean Air* (Quarterly pub. by Bureau of Sanitation, California), Berkeley, 3(1), March **1959.** 38 p. figs., tables. "This report cov the 4th year in which the Dept. of Public Health has been engaged in a widespread effort agai air pollution in California."—The smog problem in California which became acute in 1958 beca of dry weather is described. There was also a marked increase in radioactivity in two ca The radioactivity is higher in Los Angeles than in Berkeley. There is a rapid increase in monitoring in California and research is being done on the problem of visibility at Sacrame airport. The problem of effects of air pollution on human beings is under study. *Subject He ings:* **1. Smog 2. Air monitoring of radioactivity 3. Atmospheric pollution effects on v bility.**—*A.H.K.*

12L–676 551.509.9:551.510.42:7

Singer, Irving A. (*Brookhaven Natl. Lab., N. Y.*), **An objective method for site evaluati** *Air Pollution Control Association, Proceedings,* Vol. 52, **1959.** Issued **1960?** Paper No. (13 p.) fig., 18 eqs. **DWB** (M10.42 A298ap)—An attempt is made to formulate a hypoth that can be used as a starting point in combining the factors of importance relating to air po tion and to develop a rating number that will enable an objective decision to be made on th technical aspects of the relative merit of sites. Developing a mathematical model, the distribut of pollution and receptors and the effect of the pollutant on the receptors are considered qu titatively on an individual basis. It is concluded that the rating can be computed for diffe sites with their appropriate population distribution for comparative purposes. Some suggesti are made on the method of zoning from an air pollution control viewpoint. *Subject Headin* **1. Air pollution control 2. Industrial zoning 3. Urban pollution control.**—*K.C.*

12L–677 551.509.9:551.5

U. S. Argonne National Laboratory, **Report on meeting of ad hoc Committee on Scal Mesometeorological Phenomena, held at Argonne National Laboratory, May 15–17, 1** Ed. by R. C. Wanta and H. Moses. June **1958.** 26 p. 2 refs.—The discussions summar in this report concerned the usefulness of laboratory models for reproducing and studying m scale atmospheric phenomena (from somewhat over the size of a building to about 100 mi).. general the participants agreed that model techniques cannot reproduce all elements of the proto (turbulence spectrum, Coriolis force, etc.) and therefore their applicability is limited. *Subj Headings:* **1. Experimental meteorology 2. Mesometeorology 3. Scale model techniq I. Wanta, R. C.** (*ed.*) **II. Moses, H.** (*ed.*)—*G.T.*

12L–678 551.509.9:551.510.42:0

U. S. Robert A. Taft Sanitary Engineering Center, Cincinnati. **Committee on Aeros Air Pollution Research Planning Seminar, Feb. 5–7, 1958: Report of the Committee.** *Pollution Control Association, Journal,* 8(2):159–160, Aug. **1958. DLC**—The Seminar was at the Robert A. Taft Sanitary Engineering Center in Cincinnati on Feb. 5–7, 1958, under auspices of the Public Health Service. It was observed that a major shift of interest has occu recently as the result of apparent demonstrations that aerosols, in addition to their nuisance va as primary entities, also participate in and are a part of reaction systems in polluted commu atmospheres. Two areas of research were recommended. One comprising studies specifi directed toward analysis of the physico-chemical system including aerosols. The second incl project areas from which needed control data can be derived with reasonable speed. *Subject H ings:* **1. Aerosols 2. Atmospheric pollution.**—*N.N.*

AUTHOR AND SUBJECT INDEXES

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